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MAY, 1958

Precision Metal Molding

PMM

INCLUDING DIE CASTINGS MAGAZINE

DIE CASTINGS

INVESTMENT CASTINGS

PERMANENT MOLD CASTINGS

PLASTER MOLD CASTINGS

POWDER METALLURGY

SHELL MOLD CASTINGS

These engineers choose the right casting for the right job, to insure quality products at Pesco Products Div., Borg-Warner Corp. / see page 3

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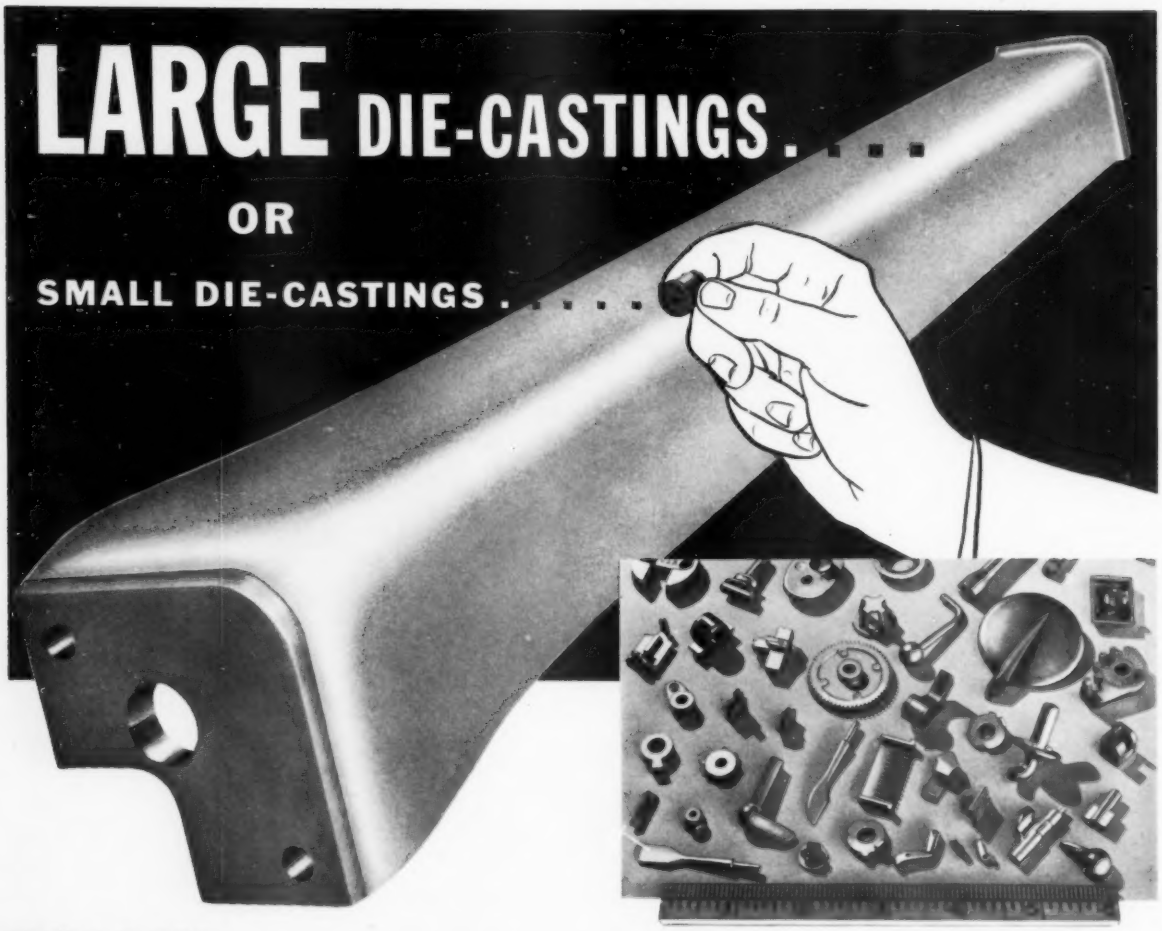

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Submit prints or samples of any parts for engineering advice or quotation.

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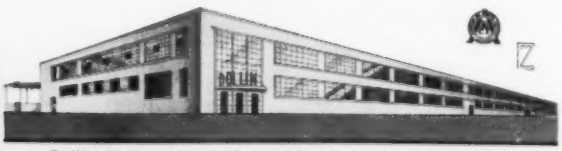

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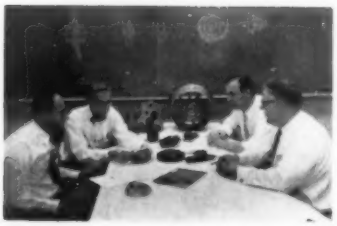

WHEN THE METHOD of manufacturing a part is right, then the final product produced will be the best possible and at the lowest manufacturing cost. This is an axiom with Pesco Products Div. of Borg-Warner Corp. All of their products must compete in the world's toughest markets: aircraft, automotive and machine tool. In these industries components may not fail, inspection and acceptance testing are severe.

The selection of the most suitable method of fabricating parts becomes, therefore, of prime importance. Every individual concerned with this selection must be able to weigh and evaluate methods and costs. Not only first costs, but machining operations that must be done on the rough, or partially formed part have to be considered. Surface finish must often be considered as must corrosion resistance.

Because of the complexity of these decisions, Pesco has teams who work together on process evaluation. The team shown above and on the cover is (left to right) Jim Prib, foreman experimental model shop; Carl Dahl, project engineer, hydraulic gear group; Jim Statuta, supervisor of design, product engineering; and Leo Waligorski, development engineer, hydraulic gear group.

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An introduction to the idea file that describes what it is, why it is needed and how to use it.

30 ARE YOUR COST COMPARISONS ACCURATE?

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Clean metal surfaces are essential for any final finishing operation. The selection of the proper cleaning method is essential if good results are to be secured.

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Many of the high speed fastening devices in common use were developed originally for use with precision molded products. This short review lists many of the more common fastening devices.

59 SINGLE OPERATOR CAN BOOST PRODUCTION 30%

By using hydraulically and air operated motors, vises and feed tables, precision machining can be put on an almost fully automatic cycle.

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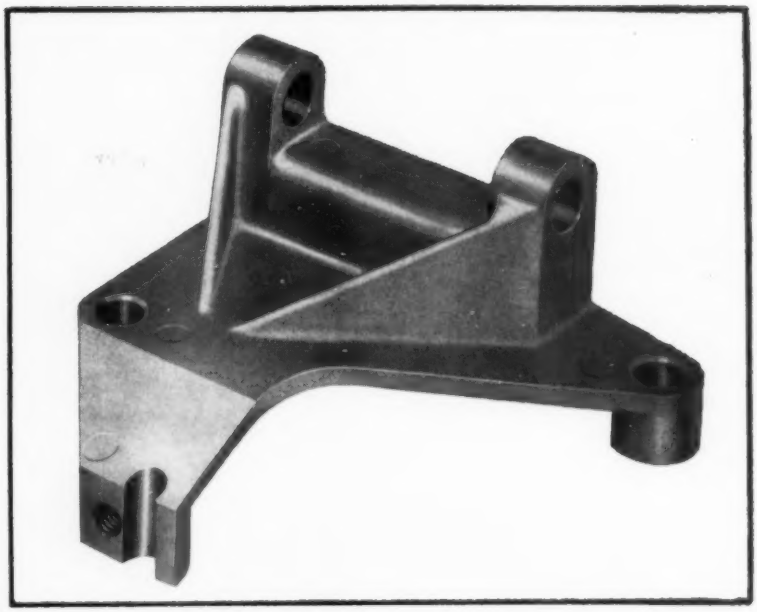

Simple for Die Casting — Complex and expensive by any other method

How else could you maintain close tolerances, keep costs in line with mass production processes and still keep the design flexibility the job calls for?

Only die casting can do it!

The manufacturer who needed this part knew, from American Die Casting Institute Product Standards,* that his requirements were within the capabilities of the process. Then he asked for application facts from Twin City engineers. By asking he saved money.

When you plan parts that call for precision, accuracy, flexible shapes . . . contact Twin City Die Casting. Twin City engineers can help you *design for die casting* to eliminate machining and finishing costs. They can take your part to any finishing stage you may desire thanks to Twin City's complete facilities.

For die castings, contact Twin City . . . you can probably save money. Many customers have.

*Product Standards available from Twin City Die Castings upon request.

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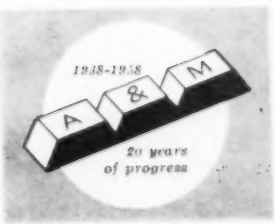
You save by having superior castings at lower casting costs.

THIRD

You save by being able to carry lower ingot inventories. Our metal is as close to you as your telephone.



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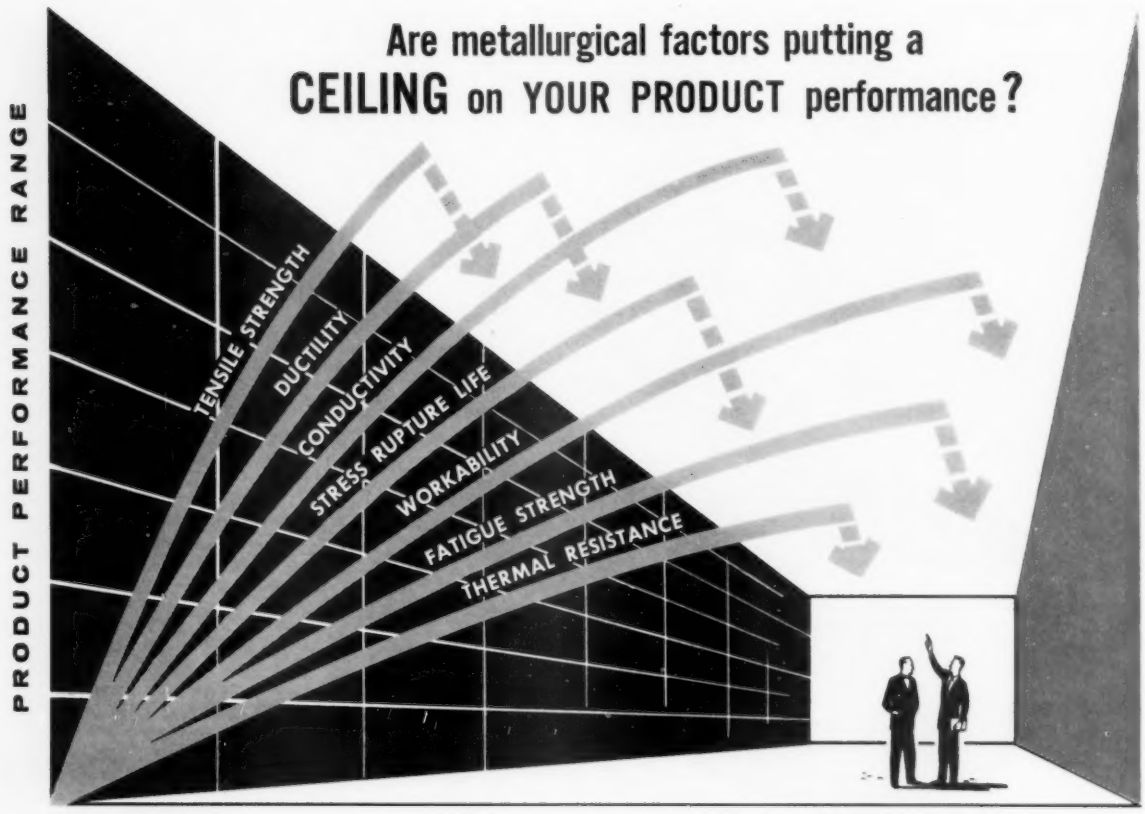

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Production or development . . . Cannon-Muskegon can exactly meet your requirements. Our metallurgists can analyze your problems and accurately determine how vacuum melting will serve you best.

UltraMet COBALT — FERROUS — NON-FERROUS — AND NICKEL-BASE ALLOYS are poured at pressures from 1 to 10 microns in this vacuum-melting furnace at Cannon-Muskegon.

***UltraMet ALLOYS** are available in a wide variety of cast or wrought forms. Billets or ingots. Bars — round, square or hex. Strips. Sheets. Wire. Experimental castings. For additional information, write for UltraMet Bulletin.*

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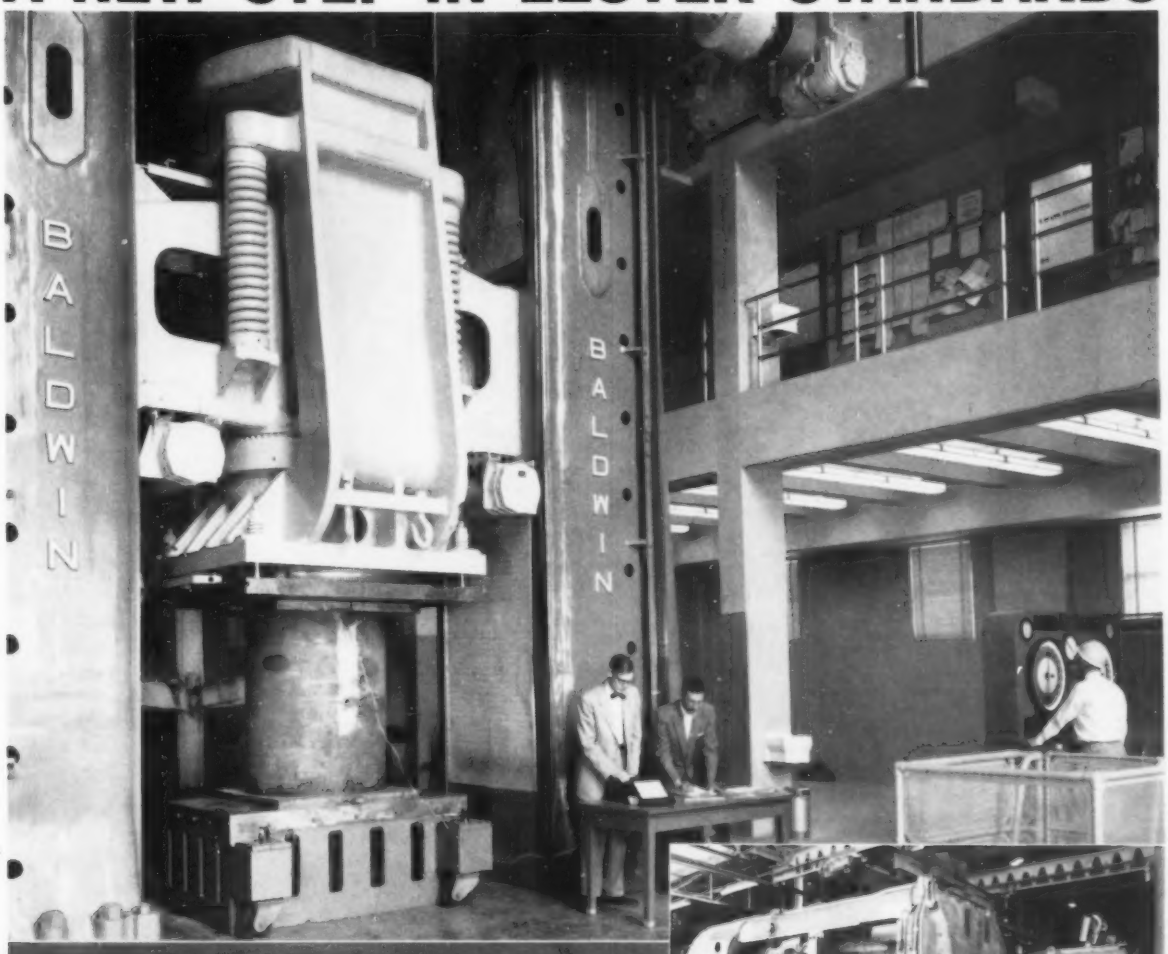
A NEW STEP IN LESTER STANDARDS

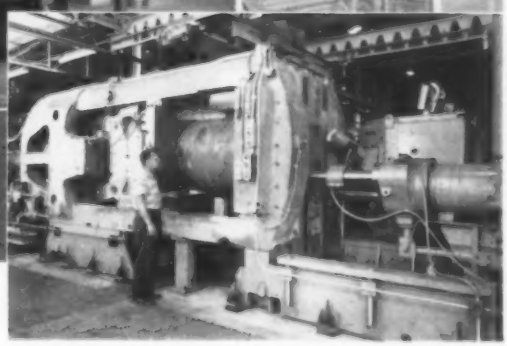


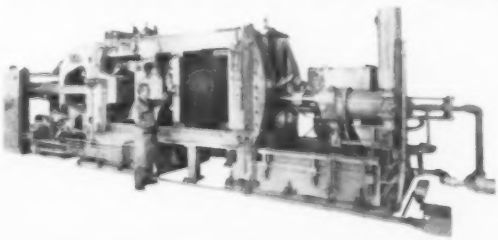
Read how 5,000,000 Lb. University Test Backs Up LESTER Locking Ratings...

A machined ring is squeezed between the jaws of a giant testing machine (capable of exerting 5 million pounds of pressure) at Lehigh University. Readings at various pressures are taken by an independent engineer. This ring is, in turn, locked between the platens of our machines and the comparison readings certify the clamping tonnage.

Why do we do it?

Because we know that the heart of controlling the quality of die cast parts is the ability of the machine to develop and *hold* its full rated locking tonnage. Only with the one-piece cast alloy frame, an exclusive feature of Lester machines, is this tonnage assured for the life of the machine. No torque, no twist, no wear, no adjustment. Just rigid, dependable, *certified* clamping tonnage.





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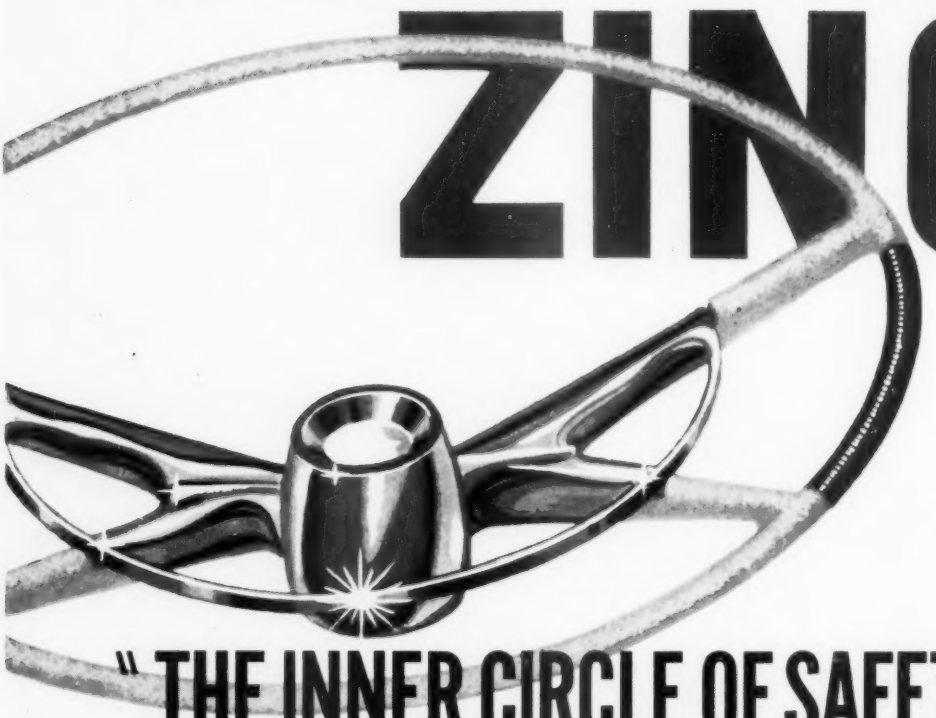
die cast from TADANAC ZINC



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An automobile horn may startle and annoy you . . . or it may save your life!

Following the curve of the steering wheel just inches away from the driver's hand, the horn ring on a modern automobile stands ready to sound a warning to pedestrians and other vehicles. It's strong, attractive and durable—die cast in Zinc!

For flexibility of design, combined with the economy of accurate, low temperature, high speed operation, die casters choose alloys of Zinc. And, for consistent high quality, assured supply and prompt delivery, Tadanac Zinc is the preferred brand for die casting alloys!

If you require information or assistance regarding your Zinc die casting operations, contact our Technical Service Staff. Your inquiries will receive prompt attention.

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TADANAC ZINC SHAPES THE THINGS TO COME

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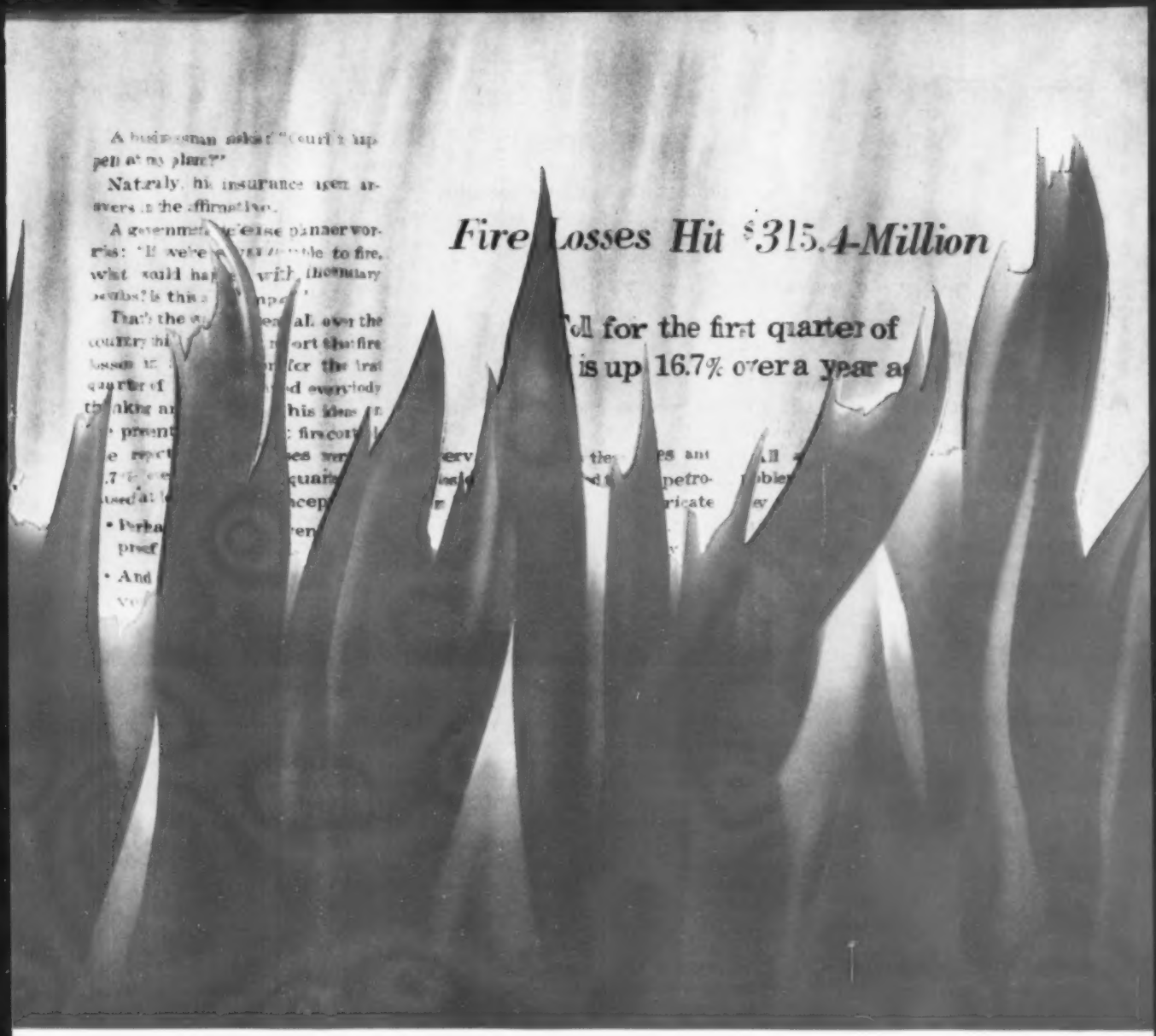

Plan against it . . . not for it!

Cellulube fire-resistant hydraulic fluids and synthetic lubricants open up new areas of in-plant fire prevention

The stakes are high – personnel, equipment, production, reputation. No one has better reasons than industry has to plan against fire.

And with today's advances in chemistry, industry has never had more effective and specialized materials with which to do just that.

Cellulube fire-resistant hydraulic fluids and synthetic lubricants are good examples. In hydraulic equipment, they reduce the danger of uncontrollable fire caused by line breaks or other failures when flammable fluids are in use. In air compressors, these non-petroleum oils not only prevent excessive carbon formations – the main source of fire and violent explosion – but also meet the severest of lubrication requirements.

Minimizing the hazards of industrial operations through development of fire-resistant Cellulubes . . . making these functional fluids available in 6 controlled viscosities for broader application . . . this is another example of Celanese research and product development at work hand-in-hand with industry.

Celanese Corporation of America, Chemical Division, Dept. S89-E, 180 Madison Avenue, New York 16.

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Acids	Functional Fluids	Polyols	Agricultural	Paper
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Aldehydes	Glycols	Salts	Aviation	Plastics
Anhydrides	Ketones	Solvents	Building	Surface Coatings
Esters	Oxides	Vinyl Monomers	Electrical	Textiles

Celanese CHEMICALS

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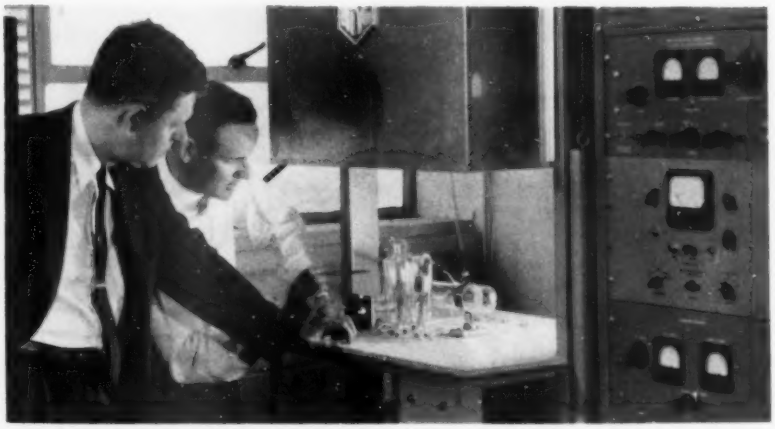
CASTING ABOUT

technical news of applications
& processes involving precision metal moldings

ULTRA HIGH VACUUM TEST CHAMBERS that operate at pressures of 10^{-10} mm of mercury are now in operation at National Research Corp.'s laboratories. These chambers simulate atmospheric conditions found at altitudes of about 400 miles above the earth's surface. This is the environment where earth satellites are expected to operate. Up to now, these very low pressure facilities have only been available on a small scale in a few laboratories. NRC's test chambers combined with their know how in the preparation of special metals and alloys make possible the large scale study of missile parts, motors and materials at extreme altitudes and in space.



LEGISLATION HAS BEEN INTRODUCED in the Senate to resume government purchasing of copper, lead, zinc and manganese. The new bill is in the form of an amendment to the domestic tungsten, asbestos, fluorspar and columbium-tantalum production and purchase act of 1956. Under the terms of the proposed amendment the government would purchase for stock piling: 400,000 tons of refined electrolytic copper at 30¢ per pound; 180,000 tons of common lead at 17¢ per pound; 280,000 tons of slab zinc at 14½¢ per pound; and 9,000,000 long ton units of manganese ore. All metal and ore purchases would be of domestically produced and refined metal or ore. The bill would also extend the asbestos, fluorspar, and columbium-tantalum domestic purchase program through 1959.

LARGER ELECTRIC FURNACES WILL BE DESIGNED to serve the demands of industry for metal refining and other special-purposes. Electric furnaces capable of extremely high temperatures have long been an important production tool in the metal refining industry. Now they are being used for the manufacture of such diverse products as synthetic mica and man-made diamonds.

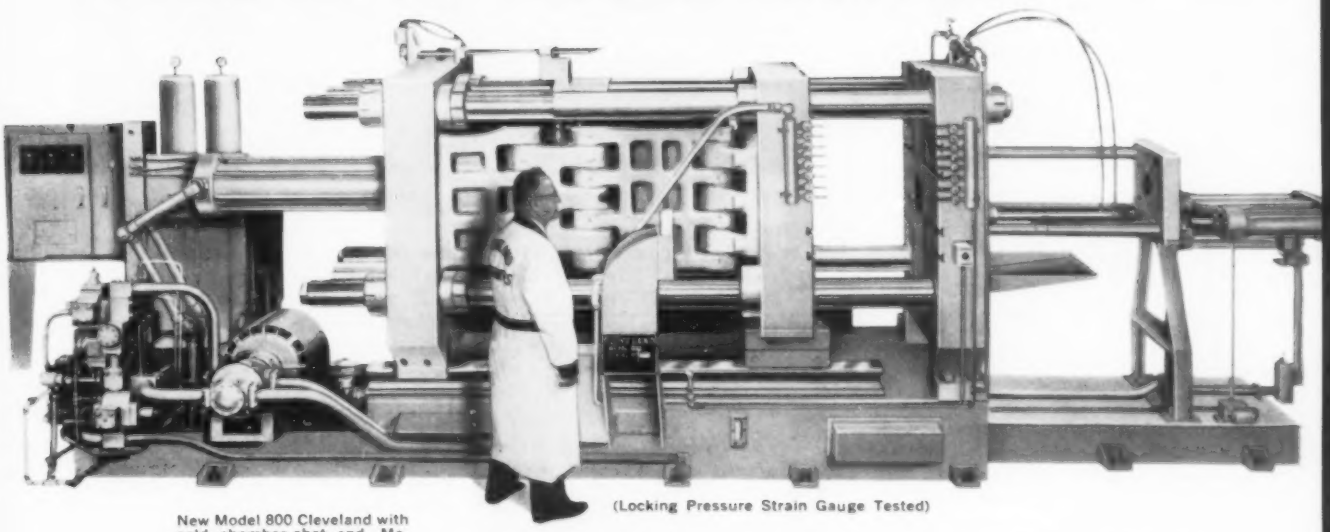
These furnaces will also play an ever more important role in research and development work, particularly as the uses of the rarer metals such as tantalum, zirconium, hafnium and others are expanded.

A MILESTONE IN COPPER REFINING AND PRODUCTION was reached when the world's first commercial unit to continuously cast tough pitch copper cakes was installed by American Smelting and Refining Co. at the Perth Amboy refinery. With the new unit, copper cakes up to 25 ft. long and 36 in. wide that weigh over 17,000 pounds can be cast. The new plant can cast more than 160 tons of copper per eight hour shift.

The water cooled mold used in casting is only 15 in. deep, but heat dissipation is so good that the cake emerges from the bottom of the mold completely solidified. Speed of casting is 1150 pounds per hour, or 20 in. of 5 in. by 36 in. cake per minute.

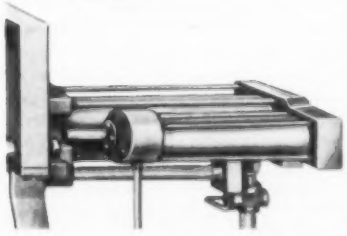
continued on page 13

NEW 800 TON CLEVELAND Hydraulic Die Casting Machine



(Locking Pressure Strain Gauge Tested)

New Model 800 Cleveland with cold chamber shot end. Machine weight is 28¼ tons. Readily converts to hot chamber operation.



Incorporating an intensifier, new Cleveland cold chamber shot end provides high pressures on metal; high plunger speeds (both adjustable).

Now available for producing castings up to 20 lbs. aluminum, 46 lbs. zinc. This *big*, newest Cleveland has 55″ x 54″ die plates; 33″ x 33″ space between tie bars; 38″ max. to 20″ min. die thickness; 15″ to 24″ die opening. Massive toggle system, with 7″ dia. tie bars and cross head guide bars, 9½″ thick platens, insures extreme rigidity and positive die alignment . . . with *guaranteed* 800-ton locking pressure!

A highly advanced design of cold chamber shot end, incorporating an *intensifier*, assures top-quality, dense castings. Shot plunger speed, after its initial slow, forward movement, can be adjusted to attain any speed up to 500 f.p.m. At any predetermined plunger position, the shot intensifier can be activated to generate plunger pressures up to 20,000 p.s.i. Intensifier pressure is also adjustable. Throughout, the new Model 800 is *Cleveland-engineered* to give you highest casting quality with utmost reliability of machine performance. Call in a Cleveland sales engineer, or write direct, for machine specifications.

Remember, Clevelands Cut Costs!

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ACHESON

dispersions digest

Reporting uses for

dag® BRAND DISPERSIONS

COLLOIDAL GRAPHITE, MOLY-SULFIDE, VERMICULITE, AND OTHER SOLIDS

'DAG' DISPERSIONS – THE ANSWER TO LOWER COSTS, BETTER CASTINGS

Acheson dispersions have proved themselves to be particularly effective as die and mold cavity coatings. They contain heat-resistant solid particles so finely divided that they remain in suspension for extended periods, making continuous agitation unnecessary. This fineness is an important characteristic because the films formed with these dispersions are so thin that they do not affect casting dimensions. As described in the following application case histories, both colloidal and semi-colloidal dispersions provide excellent parting, high-quality surface finishes, and longer die life. The consistent uniformity of 'dag' dispersions is your assurance of uniform castings.

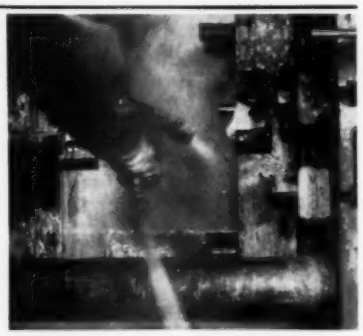
A 'dag' 193 wash sprayed on mold cavities at Rapidscast Corporation gives them aluminum permanent mold castings of more uniformly high quality.

"We're sold on 'dag' 193 because it's consistent", states Robert Cope, president of Rapidscast Corporation, Grand Rapids, Michigan. After trying 22 mold wash combinations with as many different characteristics, Mr. Cope settled on 'dag' 193 — an Acheson vermiculite dispersion with a water carrier. Why? . . . Because of its completely uniform consistency, 'dag' 193 can be easily mixed to the three dilution ratios Rapidscast uses to obtain the required variance in film thickness throughout their molds. The unbroken film provided by this dispersion acts as a heat-holding blanket which helps to prevent "shrinks" or vacuum holes caused by uneven cooling of the molten metal. Also important to Rapidscast is the durability of a 'dag' 193 film coating. One application generally lasts through an entire molding day of three shifts, except for occasional touch up at wear points. And this uninterrupted production is a "must" since Rapidscast supplies such demanding customers as the automotive, aircraft, hydraulic, marine and appliance industries.

You'll find that Acheson processing methods produce dispersions of finer quality and more versatile use. Call your Acheson Service Engineer today for more specific information on the use of 'dag' dispersions. Or write direct for additional facts on " 'dag' colloidal dispersions for use in metal casting," Bulletin No. 425. Address Dept. PMM-58.

Call in your Acheson Service Engineer today.

'Aquadag' finds ready acceptance by diecasters for its high temperature resistance, clean parting, and a smoother-surfaced casting.



Bendix finds 'Aquadag' a substantial cost saver. Rejects are down 30% at Bendix Foundries, Teterboro, New Jersey. Where surface folds, internal gas-induced porosity, and other not uncommon factors had previously caused a costly number of rejects in certain critical die-castings, Bendix now enjoys production advantages by using the Acheson water-based dispersion, 'Aquadag'. Used in casting magnesium jet-engine turbine blades and aluminum instrument components, the tough, dry lubricating film provides cleaner parting from the die. This film facilitates proper metal flow. It prevents the molten metal at 1250° F. from soldering to the steel die. It effectively resists the scrubbing action accompanying metal injection, where pressures are often as high as 30,000 psi. Proof of the inherent strength of this film is shown by the fact that one sprayed application normally lasts ten or more casting cycles. Die life is also appreciably extended. 'dag' Colloidal Graphite can play an important part in *your* casting operations . . . a lubricant that is non-volatile, chemically inert, and finely dispersed to provide complete coverage of the die surface.

ACHESON *Colloids Company*

PORT HURON, MICHIGAN

A division of Acheson Industries, Inc.

Also Acheson Industries (Europe) Ltd. and affiliates, London, England

50th

Offices in: Boston • Chicago • Cleveland • Dayton • Detroit • Los Angeles • Milwaukee New York • Philadelphia • Pittsburgh • Rochester • St. Louis • Toronto

For more information circle No. 1 on the Reader Service Card

CASTING ABOUT

continued from page 10

IMPROVED RESISTANCE to corrosion by magnesium alloys has been under study at the Polytechnic Institute of Brooklyn. The work was done under an Air Force contract. A feasibility study was made of a novel scheme to improve corrosion resistance of magnesium by alloying it with elements with lower surface tensions. These alloying metals were expected to migrate to the surface and alter the corrosion behavior of the base metal. A number of elements having lower surface tension were added to magnesium to form very pure, dilute, binary alloys. Preliminary results indicated that alloys containing antimony, germanium, indium, tin and cadmium improved corrosion resistance. In salt spray tests, these alloys compared favorably with pure magnesium.

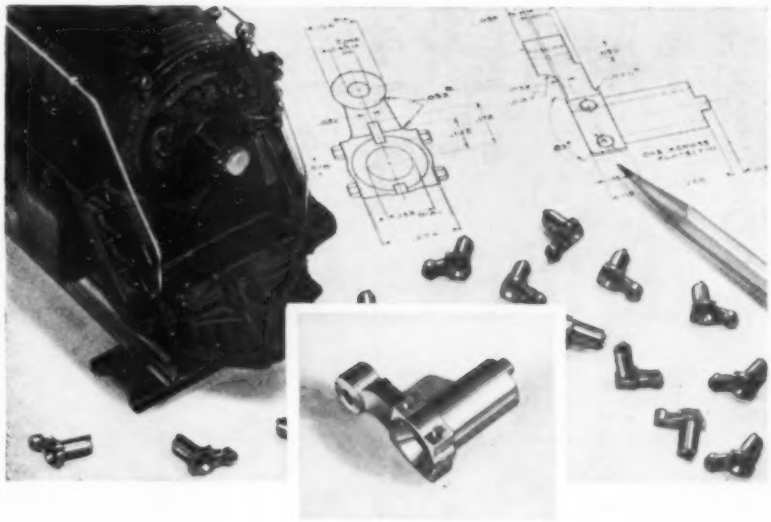
A ONE THOUSAND TON capacity press for research and development work on metals has been installed at Armour Research Foundation of Illinois Institute of Technology.

The press will be used to fabricate metals by extrusion and press forging. As installed, the press cost $150,000.

Built by the Hydraulic Press Manufacturing Co., the press, which weighs 78 tons, will allow researchers to work with alloys that cannot be shaped by rolling or hammer forging. Among such alloys are those used in nuclear power engines, jet engines, missiles, and atomic power reactors. Extrusions from 40 to 45 feet long can be run on the new press.

AN ALUMINUM INGOT, the largest ever cast was recently produced by the Reynolds Metals Co. Nearly four times the size of normal aluminum ingots, this giant is one and one-half feet thick, six feet wide and 17 feet long. It weighs 12 tons. The department of incidental intelligence reports that if this ingot were rolled into standard weight foil the strip would stretch from Chicago to Detroit.

GRC DIE CASTING HELPS LIONEL ACHIEVE TINY PART AUTHENTICITY



Tiny, intricate, too costly to make in their own plant, GRC's specialized techniques made this Toy Crank economically possible

While it would seem more advantageous for manufacturers to make all parts in their own plants, some have found that a specialist can do it cheaper, faster, and sometimes even better. This Lionel toy crank is an example. GRC specialized techniques made it possible for them to produce this tiny authentic part more quickly and more economically than Lionel could themselves. Die cast in zinc alloy in a single automatic operation, the cost of the GRC crank was little more than $5.00 per thousand in lots of 500,000.

Miniature in size, intricate in shape, this crank is typical of the many small parts problems economically solved by GRC. It is typical too of the close tolerances and uniformity achieved by Gries' fully automatic methods. Whether simple or complex, quality is high — no secondary operations, no scrap loss. GRC parts leave the machines ready for immediate use.

If you have a small parts problem, need flexibility in design, write for Gries' informative bulletins on Zinc Alloy Die Castings and Injection Molded Plastics, or send prints for quotations. There is no minimum size. Maximum: 1¾" long, ½ oz. in zinc alloy; 1¼" long, .03 oz. in plastic.

GRC die cast zinc alloy high series cap nuts now cataloged in stock

Never before available to industry as a stock item, GRC now offers prompt delivery from stock on cap nuts with up to 50% greater thread depth, in a complete range of hex sizes from 5/16" to ⅝"; thread sizes from #6 through 7/16".

GRC offers wide range of head types and sizes in molded nylon screws

Molded by GRC's specialized techniques which make the most of nylon's outstanding properties . . . these high quality, close tolerances screws have clean accurate threads, come in a variety of types, thread sizes, lengths and points.

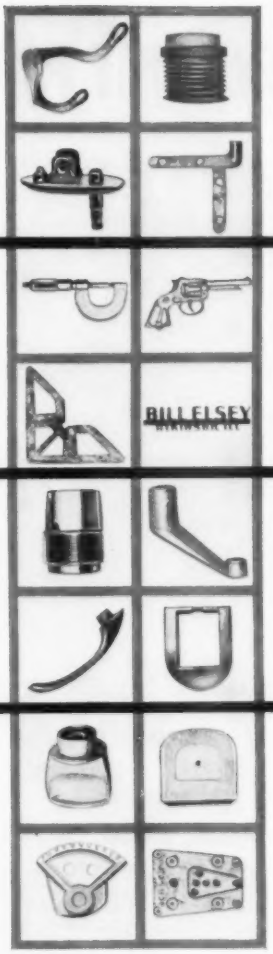
Yours for the asking —GRC HANDY GUIDE TO LOW COST QUALITY FASTENERS

WORLD'S FOREMOST PRODUCER OF SMALL DIE CASTINGS

GRIES

GRIES REPRODUCER CORP.

157 Beechwood Avenue, New Rochelle, N. Y. • New Rochelle 3-8600



DIE CAST SMALL PARTS

(up to 1 lb. capacity)

FASTER

Average production rates are **600-1,000 shots per hour**...operating **continuously,** hour after hour, day after day!

BETTER

More **"hardware" quality** die castings are produced on **DCMT machines** every year than on any other die casting machines!

FOR LESS

Lower **machine** cost, **die** cost, **per-piece** cost, **maintenance** cost...and lowest **floor space utilization** per casting mean that you can bid for a **larger share** of the growing up-to-one-pound die casting market!

new

DCMT IMP/96 mk II

the industry's most popular die casting machine

Write today for illustrated booklet!

DCMT SALES CORP., Dept. DE-368
Division of British Industries Corp., Port Washington, New York
Gentlemen: Please send IMP/96 mk II booklet.

Also send literature on these other DCMT die casting machines:

☐ **RAM Automatic** (fully-automatic)

☐ **ADC 56 Rotorcaster** (for casting aluminum around rotors of small motors)

NAME _____

TITLE _____

COMPANY _____

ADDRESS _____

B.I.C. ENDORSED QUALITY

DCMT SALES CORP.
Division of British Industries Corp.
Port Washington, New York

For more information circle No. 13 on the Reader Service Card

OPPORTUNITIES

Opportunities rates: $20 for the first column-inch; $15 for each additional column-inch payable in advance. To answer box number advertisements, address responses to the box at Precision Metal Molding, 812 Huron Rd., Cleveland 15, Ohio. Closing date: 1st day of month preceding publication.

POSITIONS OPEN

ZINC DIE CAST LINE — Last year our well established manufacturers agency sold over $500,000 die cast volume in greater Chicago. We are interested in reputable quality source. Must have plating and painting facilities. PRODUCTION COMPONENTS CORPORATION, 6400 W. Raven St., Chicago 31, Illinois, 809 Fisher Building, Detroit 2, Michigan.

DIE CASTING CONSULTANT: LET MY TWENTY-FIVE YEARS OF VARIED EXPERIENCE WITH ALUMINUM AND ZINC HELP YOU. Box No. 5158.

Progressive West Coast investment casting company has the following permanent openings for experienced personnel: CHIEF METALLURGIST — Degree required, plus minimum 2 years experience with investment casting ferrous metals. TOOL & DIE FOREMAN — Must have minimum 2 years experience with wax molding dies. Supervisory experience required. CHIEF INSPECTOR — Minimum 1½ years experience with inspection of investment castings. Supervisory experience required. Send resume to Box No. 5258.

WANTED: Manufacturer's representatives who are thoroughly familiar with investment castings to represent Cadmet Corp. in Philadelphia area. Also in New Jersey, New York, Arizona, Illinois, Western Pennsylvania, North and South Carolinia, and Maryland. Box No. 5358.

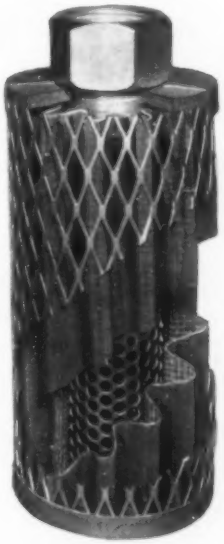
SALES ORGANIZATION AVAILABLE — Established sales organization desires to add line, preferably diecasting with electro-plating facilities. We deal only with high production type OEM. Our main office is in Cincinnati, with branch office in Cleveland providing concentrated coverage in Ohio, Kentucky and Tennessee. All replies confidential. Box No. 5558.

EQUIPMENT

FOR SALE: Two (2) Reed-Prentice #1½ zinc die casting machines. Both 1946 models. Can be seen in operation. Reply Box No. 5458.

More And More Manufacturers Are Installing
MARVEL SYNCLINAL FILTERS
AS STANDARD EQUIPMENT

Manufacturers of hydraulically actuated equipment and others with low pressure liquid circulating systems demand their equipment to perform consistently with all the productive efficiency they build into the machine that bears their name. Since these systems must be kept free of damaging particles, the selection of a filter is an important factor. Here are some of the outstanding reasons for the increasing preference for Marvel Synclinal Filters to do this all-important job!



SUMP TYPE (cutaway)

BECAUSE . . . Marvels are designed to give maximum ACTIVE filtering area rather than total filtering area. Only ACTIVE FILTERING AREA COUNTS!

BECAUSE . . . Marvels greater storage space for filtered out particles allows longer periods of "operating" time at absolute minimum in maintenance cost and "down-time."

BECAUSE . . . Marvels are protected and of sound construction to give long life and efficient filtration. THEY MEET J. I. C. STANDARDS.

BECAUSE . . . Marvels can be disassembled, cleaned and reassembled by any workman in a matter of minutes. Line type operates in any position and may be serviced without disturbing pipe connections.

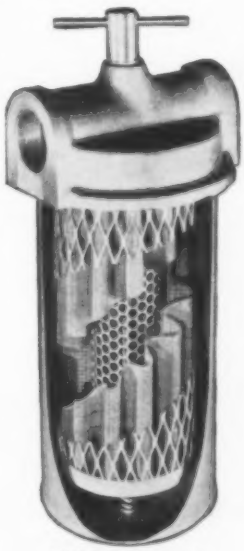
BECAUSE . . . Marvels (Both Sump and Line Type) are available in individual capacities from 5 to 100 G.P.M. and choice of mesh sizes ranging from coarse 30 to very fine 200, they get a filter to fit their specific requirements.

FACTS—NOT CLAIMS

Engineers decide on the basis of the record, on the basis of measurable facts rather than claims of the "campaign promise" variety. Here is a fact with meaning —

OVER 800 O. E. M.'s

Install MARVEL Synclinal FILTERS as Standard Equipment!



LINE TYPE (cutaway)

For Dependable Protection on All Hydraulic and Low Pressure Systems investigate

MARVEL SYNCLINAL FILTERS

IMMEDIATE DELIVERY

Catalogs contain complete engineering data and dimensional charts making it easy to order a filter for your specific requirements and get Immediate Delivery.

FOR FURTHER INFORMATION WRITE, WIRE, PHONE OR USE COUPON BELOW

Catalogs containing complete data available on request

MARVEL ENGINEERING COMPANY
7227 N. HAMLIN AVE.,
CHICAGO 45, ILLINOIS
Phone: JUNIPER 8-6023

Without obligation, please send me complete data on Marvel Synclinal Filters, as indicated:—

- ☐ Catalog #108—For Hydraulic Oils, Coolants, Lubricants
- ☐ Catalog #200—For Fire-resistant Hydraulic Fluids (Aqueous Base)
- ☐ Catalog #400—For Fire-resistant Hydraulic Fluids (Synthetic)
- ☐ Catalog #301—For Water

PMM-5

Name .....

Company .....

Address .....

City .....

State .....

100 ton MIDGET . .

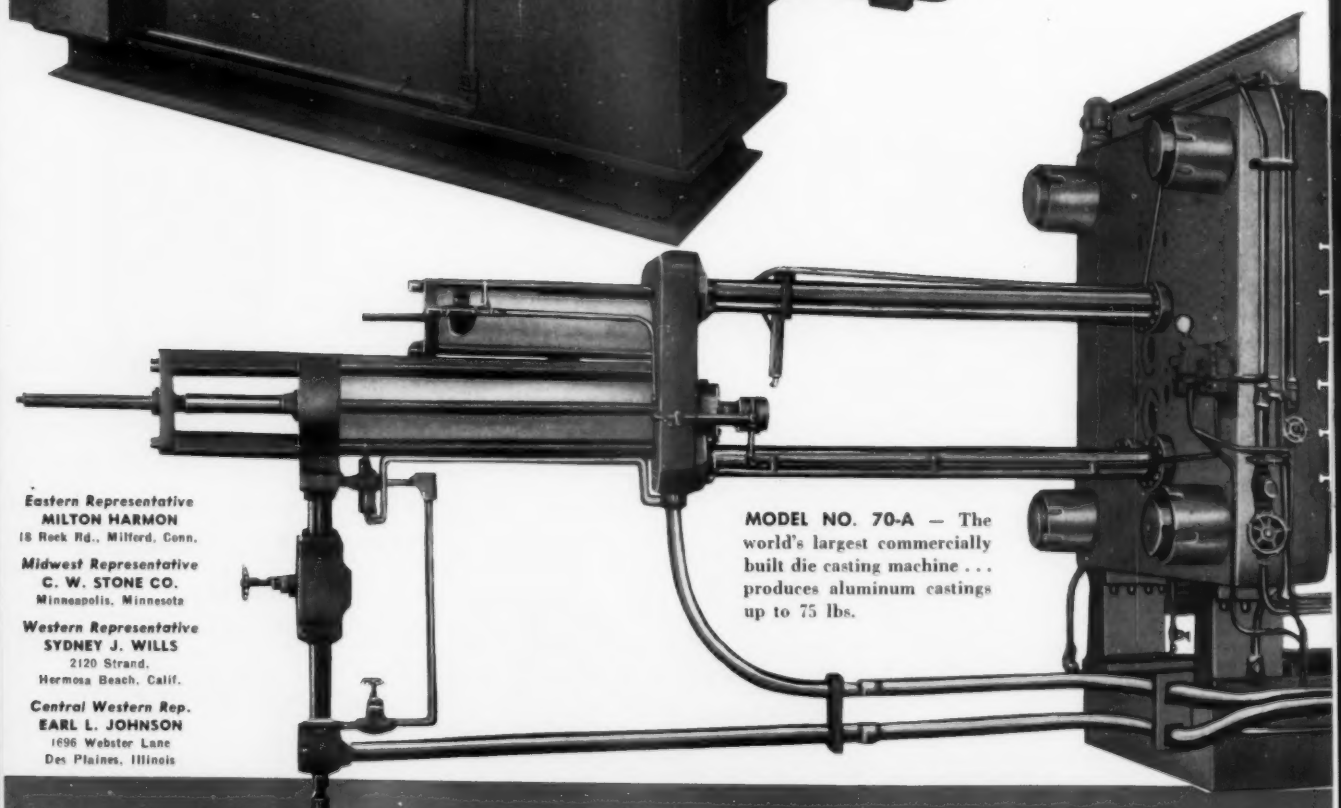
. . . there's a CAST-MASTER

OVER 20 STANDARD MODELS

INCLUDING ZINC, ALUMINUM

AND MAGNESIUM MACHINES

MODEL NO. 7-Z — For zinc, tin or lead. A natural for any die casting shop that specializes in small or medium size castings weighing up to 2½ pounds.



MODEL NO. 70-A — The world's largest commercially built die casting machine . . . produces aluminum castings up to 75 lbs.

Eastern Representative
MILTON HARMON
18 Rock Rd., Milford, Conn.

Midwest Representative
C. W. STONE CO.
Minneapolis, Minnesota

Western Representative
SYDNEY J. WILLS
2120 Strand,
Hermosa Beach, Calif.

Central Western Rep.
EARL L. JOHNSON
1696 Webster Lane
Des Plaines, Illinois

CAST-MASTER *inc.*

. 1200 ton GIANT

to meet every production requirement!

Yes, large or small, there is a CAST-MASTER Die Casting Machine to meet every need. Over 20 standard models — from the smallest to the world's largest commercially built die casting machine. Featuring many exclusive engineering achievements that have proven themselves in years of actual service. For high speed production . . . for top performance in turning out uniform quality castings, you'll find CAST-MASTER sets the pace for the industry.

Design, Production and the Development of Dies

Cast-Master's new expanded operation now offers a complete package . . . jigs, fixtures, dies . . . designed and developed to meet every requirement. Whatever your problem our engineering department is equipped to tackle it. Phone, write or wire, without obligation.

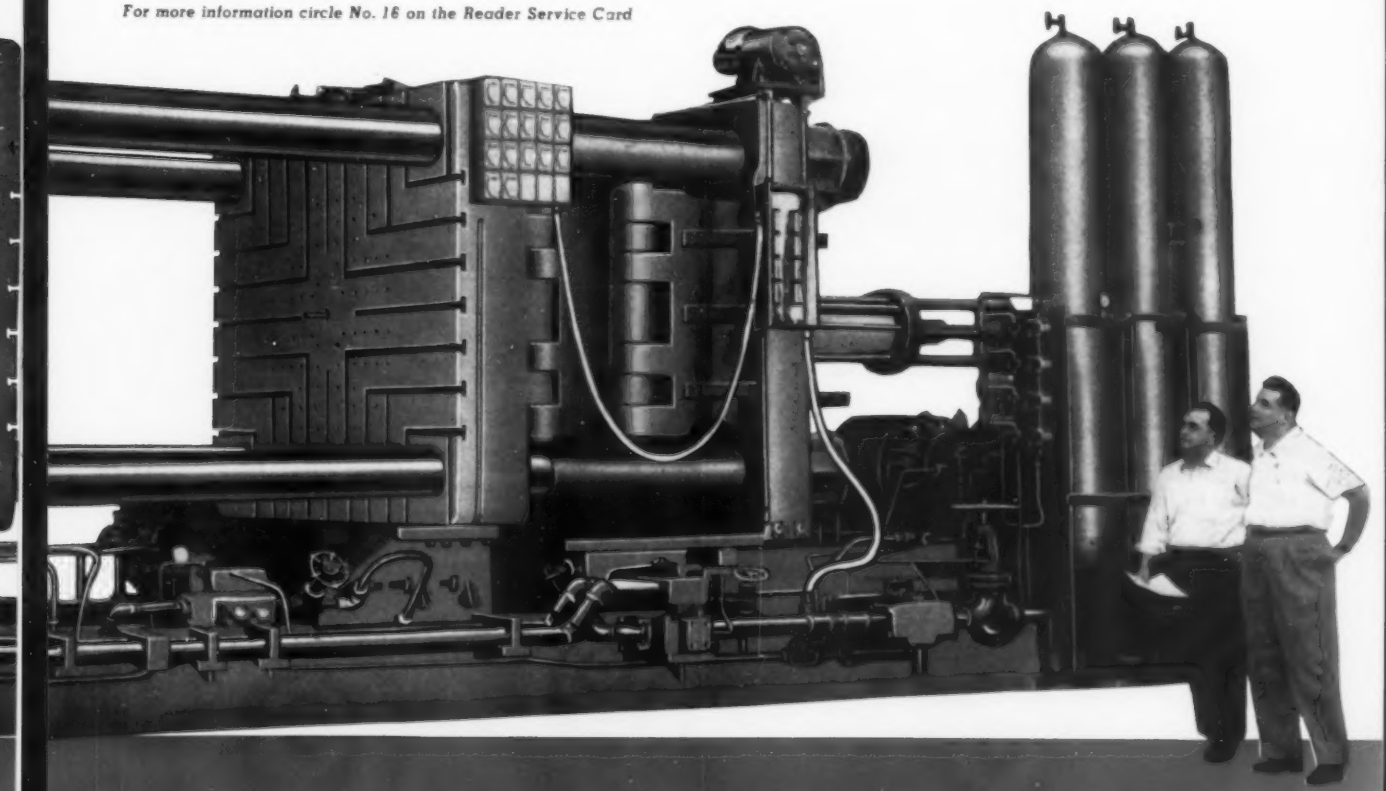
For more information circle No. 16 on the Reader Service Card

NEW! MULTIPLE CAVITY LOADER-UNLOADER

• Loads Laminations • Die Casts
• Trims • Unloads 4 Rotors Automatically

A major motor manufacturer gave Cast-Master the job of stepping up production and reducing labor on die-casting laminated rotors. Cast-Master solved the problem with a new automatic loader-unloader.

NEW DETAILED BROCHURE AVAILABLE



23901 Aurora Rd. • Bedford, Ohio

This part cast from a magnetic alloy, Hipernik®, cut production costs 80%

CUT COSTS WITH INVESTMENT CASTING OF MAGNETIC ALLOYS

Many of today's alloys are difficult or impossible to machine or forge. Many magnetic parts and components are so intricate in shape that to machine them would require multiple set-ups. Investment casting minimizes machining costs, yet retains the magnetic properties you need.

Westinghouse can provide castings of high-nickel magnetic alloys that retain comparable magnetic properties of wrought materials. With value and cost analysis so important, consider precision investment casting of your magnetic product components.

Whether you need small quantities of prototype parts or production runs, the Westinghouse Metals Plant has the complete metal facilities and experienced engineers to help improve cost and quality of your component parts. For further details on Investment Castings, ask for DB-52-500. Write Westinghouse Electric Corporation, Materials Manufacturing Department, Blairsville, Pa. J-05006

YOU CAN BE SURE...IF IT'S Westinghouse

For more information circle No. 70 on the Reader Service Card

PMM LETTERS

the readers' forum

PARLANTI METHOD

The March, 1957 issue of PRECISION METAL MOLDING carried an article by Lester D. LaMotte on the Parlanti Method of Permanent Molding.

We operate an aluminum permanent mold foundry and are interested in learning more of this process.

Will you please let us know where additional information may be had, or the address of Mr. LaMotte's company so that we may contact him.–L.A.R., engineer.

Patents on the Parlanti process are held in this country by Niforge Engineered Castings, Inc. The address has been furnished. – Ed.

PERMANENT MOLD CASTING

We are interested in obtaining information regarding Permanent Molds for Gray Iron Castings. Sources of technical literature on the methods used in this process will be greatly appreciated. – S.S.B., research and development dept.

Source information has been furnished to this reader. – Ed.

DIE CAST ROTORS

We are interested in obtaining literature on the die casting of small lamination rotors. Will you please advise if you can recommend any literature on this subject and where we might get it. – A. M. purchasing dept.

Several companies who manufacture die casting machines put out special units for die casting motor rotors. The reader has been referred to these companies for information. – Ed.

FINISHING CASTINGS

Please send us a copy of "Organic Coating of Die Castings" (March, 1956) and "How To Select Abrasives For Blast Cleaning." – J.V.G., Industrial Service Mgr.

continued on page 24

REPUBLIC STEEL REPORTS ON...

PROJECT 501

PHASE #1

IMPROVED CDF POWDERS

I—PHYSICAL PROPERTIES

A. Higher tensile strengths.

B. Greatly improved compressibility.

C. Higher elongations in the presence of copper.

D. Higher apparent density.

E. Predictable dimensional characteristics retained after sintering.

II—APPLICATIONS

Improved *Controlled Dimensional Factor* Powders—Type "G" for growth, Type "N" for normal or zero dimensional change, Type "S" for high shrinkage after sintering—are ideally suited for the molding and manufacture of mechanical parts.

III—TOOLING, DESIGNING, FABRICATING BENEFITS WITH CDF

A. Tool engineers can design tools to part-print dimensions with the assurance that tolerances, transverse to the direction of pressing, can be held within ±.001 inches per inch with copper additions.

B. Design engineers are aided in establishing final part dimensions by consistently uniform shrinkage and growth values. These predetermined values never vary from lot to lot.

C. Fabricators benefit from faster production, reduced costs, minimum scrap loss, production of a greater number of uniform parts per pound of powder.

PHASE #2

NEW MS POWDER

Republic's new MS is a soft, higher purity powder with excellent carbon compatibility.

I—PHYSICAL PROPERTIES

A. Tensile Strengths—In the presence of a 1% graphitic condition, physical properties can be obtained ranging from 42,000 psi at 6.1 sintered density to 53,000 psi at 6.5 sintered density.

B. Compressibility—

Briquetting Pressures		
20 tons at 6.0 30 tons at 6.4 40 tons at 6.65 50 tons at 6.8	}	Green Density

C. Dimensional Change—From —.001 inches per inch at a 5.95 green density to a +.002 at 6.7 green density.

D. These values obtained by sintering in an Endo Thermic Atmosphere: air-gas ratio 2.5 to 1; dew point +10° to 13°F; 2050°F; 45 minutes at heat.

II—APPLICATIONS

A. Can be used for comparable strength structural parts at *lower cost* than obtainable with copper.

B. Ideally suited for use in electrical part and electric motor applications—pole pieces, cores, armatures, etc.

C. Can be used to fabricate larger parts on normal pressing equipment. MS Powder's softness makes this fabricator benefit possible.

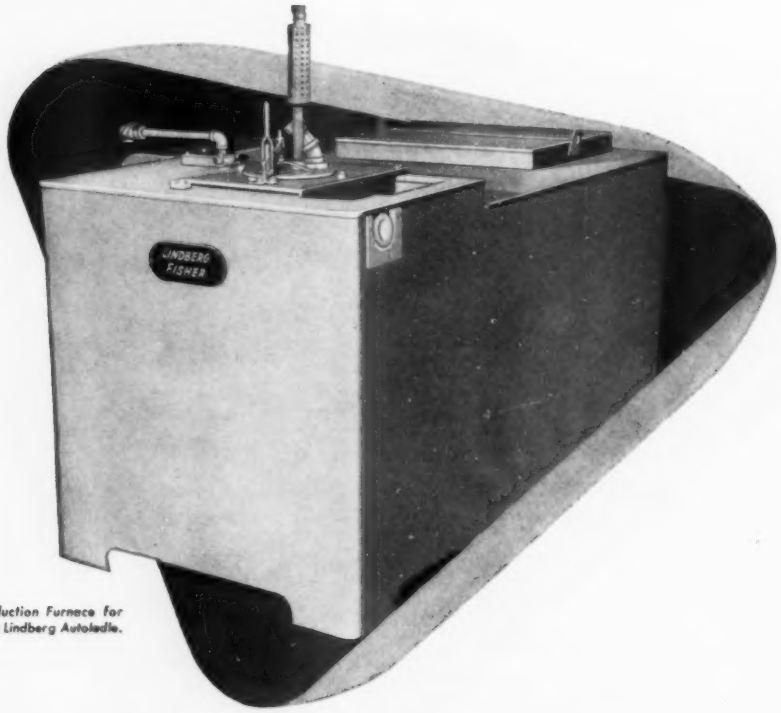
Write Dept. PM-5476, 1441 Republic Building, Cleveland 1, Ohio, for complete facts on improved CDF Powders and the new MS Powder.

REPUBLIC STEEL

GENERAL OFFICES • CLEVELAND 1, OHIO

World's Widest Range of Standard Steels and Steel Products

Here's the ideal combination for casting aluminum automatically



Lindberg-Fisher two-chamber Induction Furnace for melting and holding equipped with Lindberg Autoladle.

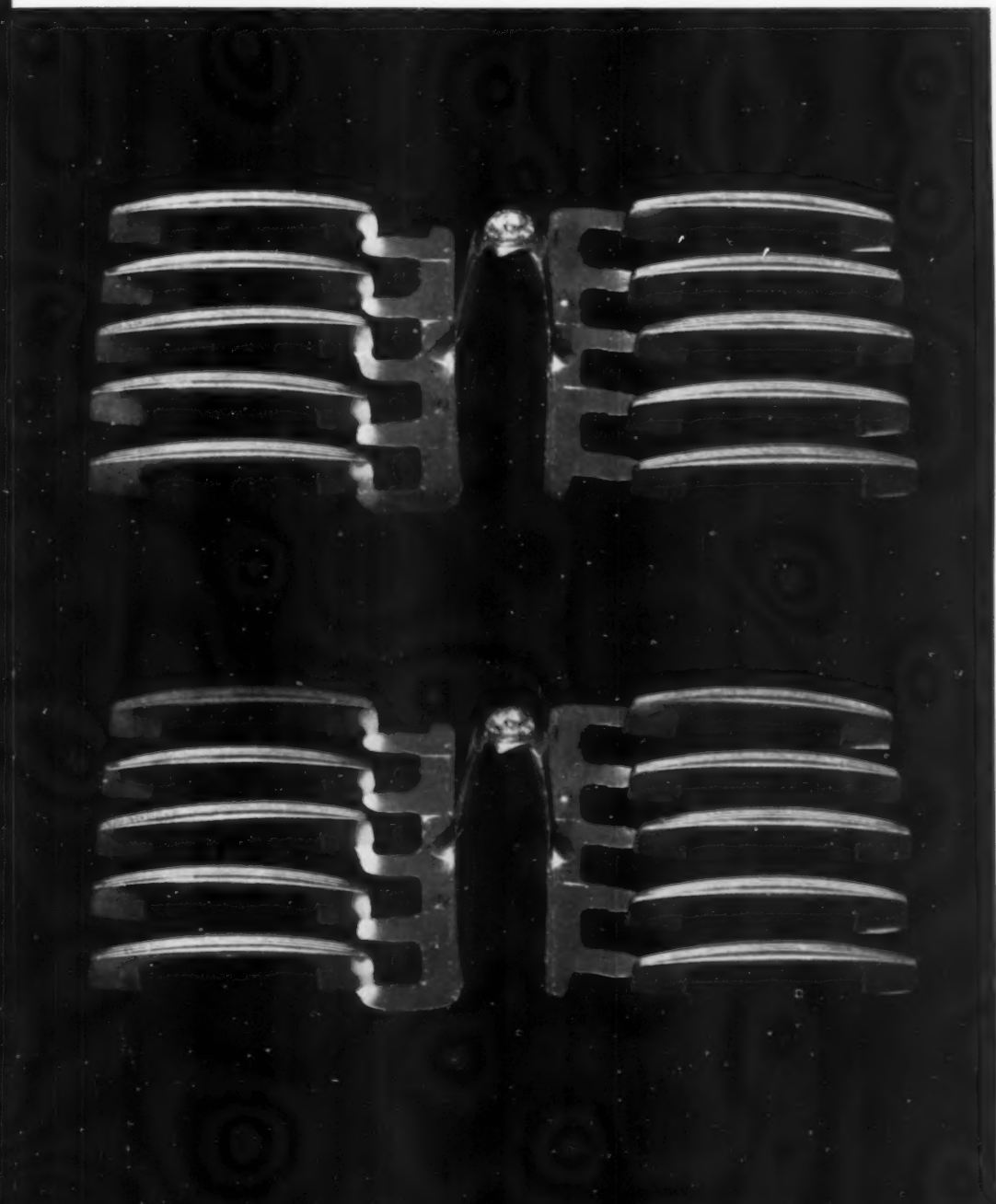
Do you die-cast aluminum? Then take Lindberg's famous two-chamber induction melting and holding furnace, add "Little Joe" Lindberg's new automatic pump, and you'll have the most efficient automatic combination anywhere. The Lindberg-Fisher two-chamber furnace *melts* in one chamber, *holds* metal at precisely the right temperature in the other chamber, and "Little Joe" automatically delivers exactly the right size shot to the casting machine. With this combination all handling of molten metal is eliminated, perfect control of metal temperatures and shot size is maintained, and all automatically. For safer, more economical, more precise handling of aluminum or any non-ferrous metals or alloys better see Lindberg. Just get in touch with the Lindberg plant or the Lindberg Field Representative in your locality, or write Lindberg-Fisher Division, Lindberg Engineering Company, 2463 West Hubbard St., Chicago 12, Illinois. Los Angeles Plant: 11937 S. Regentview Ave., at Downey, California.

LINDBERG heat for industry

For more information circle No. 38 on the Reader Service Card

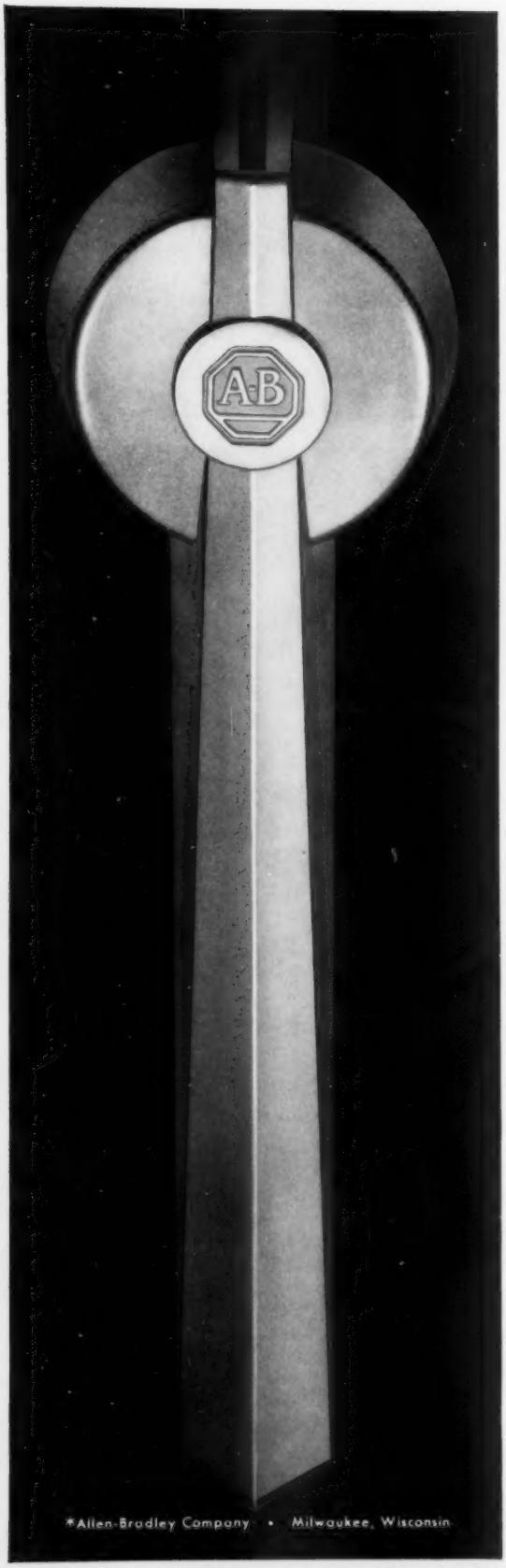
Completely controlled production provides you with die cast metals of highest purity and uniformity. Federated Di-Metal is made from special high grade zinc, electrolytically refined by Asarco-developed processes. Production is now concentrated "under one roof" at Corpus Christi, Texas, one of the world's largest plants producing special high grade zinc. Integrated production—controlled from mine to finished alloy—assures you of lower cost Zinc Di-Metal of the highest purity and uniformity. Federated can serve your Di-Metal needs through 22 sales offices throughout the country. There's one near you. Federated Metals Division, 120 Broadway, New York 5. In Canada: Federated Metals Canada, Ltd., Toronto and Montreal.

FEDERATED METALS DIVISION OF



ASARCO

AMERICAN SMELTING AND REFINING COMPANY



Fundamental Characteristics

emphasized in design details with MADISON-KIPP zinc and aluminum die castings

The carry-through designer permits no unworthy detail to mar his fundamental design effect.

Look at the *AB handle here illustrated. The Kipp die casting faithfully protects the product designer's emphasis on superior quality and last word engineering features.

The attentive mechanics at Madison-Kipp invite you to clip this ad as a reminder to contact them for close cooperation on the momentous details of design, when you next have die casting requirements.

kipp

MADISON-KIPP CORPORATION

213 Waubesa Street • Madison 10, Wisconsin

Skilled in Die Casting Mechanics • Experienced in Lubrication Engineering
Originators of Really High Speed Air Tools

For more information circle No. 40 on the Reader Service Card

Zinc + Die Casting

ELIMINATES MULTIPLE-PIECE ASSEMBLY

The one-piece housing of this electrically-driven, extendable-rod type radio antenna is designed to hold all the drive components. Manufactured by The Pioneer Specialty Company, Detroit, it also provides the means of attaching the motor and the main tube to the mast assembly.

Use of zinc for the housing provides maximum corrosion resistance without additional finishing. Due to the high fluidity of zinc alloys at casting temperature, die castings of highly complex design needing little or no machining can readily be produced. Of all the metals commonly used in die casting, zinc alloys rate highest in dimensional accuracy. Since tolerance within the gear centers of the housing had to be held to ± .002, the selection of zinc for this application was based on the superior properties inherent in the metal.

OVER 5,000,000* RADIO LISTENERS ARE ON WHEELS

To get extra mileage from this vast audience the Mutual Broadcasting System has set up an experimental "auto network" of 31 stations stretching from Buffalo to Miami. Purpose: frequent weather announcements plus advice not only on the best routes but on what local station to tune in for news of conditions on the next leg of a long drive north or south. If the new scheme works out, Mutual plans to extend it to all 450 network affiliates.

*National Average Day, 7 A.M.-10 A.M.

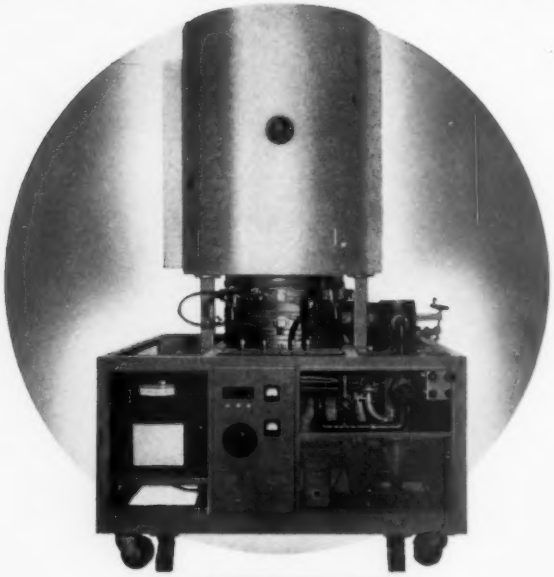
DIE CASTING is the Process... ZINC, the Metal
...BUNKER HILL, the Preferred Zinc

BUNKER HILL 99.99+% ZINC

EASTERN SALES AGENTS:
ST. JOSEPH LEAD CO., 250 Park Avenue, New York 17
SALES OFFICE FOR PACIFIC COAST:
NORTHWEST LEAD COMPANY, Seattle, Washington

Zn-104

HIGH VACUUM
ANNEALING • SINTERING • WELDING • BRAZING &
HEAT TREATING



Kinney®

HIGH VACUUM FURNACES

The Bell-type Annealing Furnace shown above is but one of many KINNEY High Vacuum Furnaces developed for improved metal treating. From melting, alloying and casting to degassing, sintering, annealing, brazing and welding, KINNEY provides the High Vacuum equipment to meet your special needs for product improvement.

The approach of KINNEY engineers to modern High Vacuum techniques is based upon many more years of Vacuum "know-how." This is reflected not only in the practicality of the equipment but in the economic advantages in design, operation and maintenance, as well. Write for outline of advanced techniques in vacuum heat treating, or better still, make a date to discuss your Vacuum Furnace problems today!

WRITE FOR LITERATURE DESCRIBING NEW DEVELOPMENTS IN HIGH VACUUM EQUIPMENT

KINNEY MFG. DIVISION
THE NEW YORK AIR BRAKE COMPANY
3601E WASHINGTON STREET • BOSTON 30 • MASS.

Please send me your latest literature on KINNEY Heat Treating Equipment ☐ Please have an engineer call me ☐

Name_____

Company_____

Address_____

City_____ Zone____ State_____

For more information circle No. 46 on the Reader Service Card

LETTERS

continued from page 18

MORE ABOUT ELOXING

In the February issue of PMM we published a letter asking what is meant by "Eloxing" a mold. Several dozen readers wrote in to tell us about the Elox Corp., of Royal Oak, Mich. and their method of making die cavities. Now comes this letter from Grorud, Norway. – Ed.

Please refer to page 21 of your February issue under the "Reader's Forum." The term "Eloxing" is a German trade name for anodizing of aluminum. – Th.D.

PMM BOOKS

ESTIMATING MACHINING COSTS, By C.W.S. Parsons, McGraw-Hill Book Co., Inc., New York, N.Y. Price $8.00

Estimating Machining Costs is a guide to help in making accurate and profit-supporting estimates of the cost of machine-tool operations.

The book shows how to study the engineering drawing of a work piece and decide how it can be made; to make a breakdown analysis of necessary operations and the elemental subdivisions, considering men, materials, tooling, and machines; and to put time and money values on the factors contributing to completion of the work.

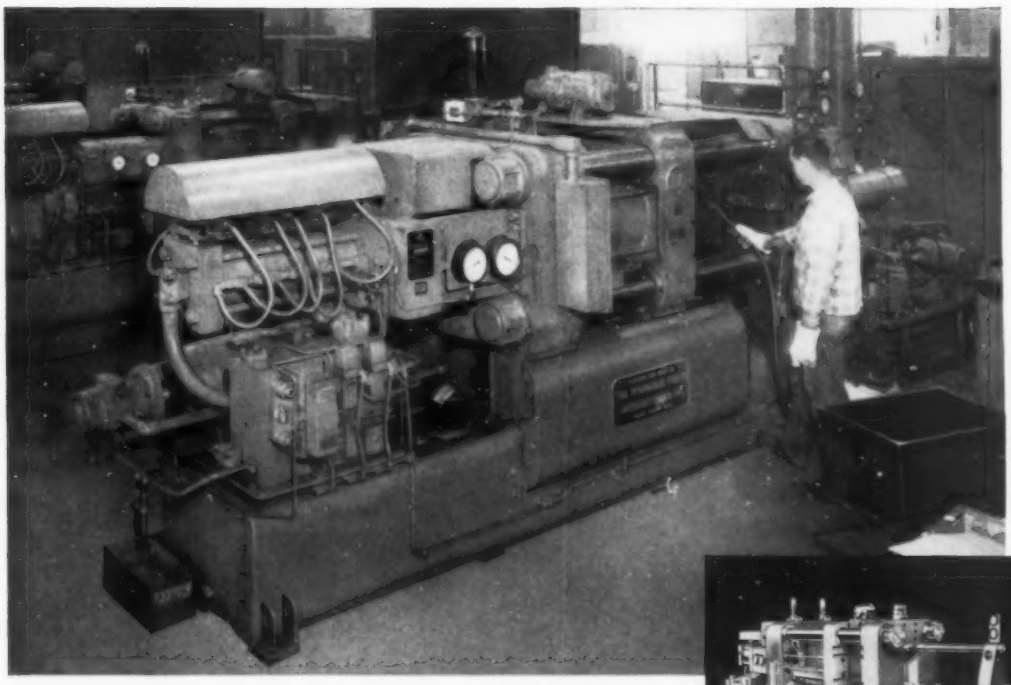
Fundamentals are covered in a discussion of the relation of cost estimating to engineering, and of such basic factors as tool life, machinability, and cutting-tools.

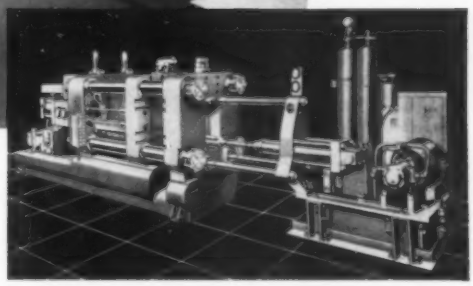
After this background has been established, the book discusses specific estimating problems in connection with such tools and operations as high-speed drills, hole-producing operations, radial drilling, milling machines, turret lathes, broaching machines, eccentric turning jobs, and others.

Recent advances in the machine-tool field also covered are: 1) ceramic tools; 2) tungsten carbide cutting tools; 3) throwaway insert cutting tools; 4) tool life for minimum operating cost; and 5) electronic computers and programmers.

continued on page 26

NOW MINNEAPOLIS-HONEYWELL
DIE CASTING WITH H-P-Ms





The Reason . . . Top Quality Parts are a MUST with This Company

With the installation of five H-P-M die casting machines in this company's new Golden Valley Plant, Minneapolis, the rigid requirements for die castings going into its finished products have been met. Confronted with the need for airtight and watertight castings to assure protection for their products in the field, high quality wall sections and surface finish are an absolute necessity. Yes, the new H-P-M approach in metal injection and the rigid clamp is doing the job. Then, too, the rate of production with these machines has been high and rejects have been reduced to a minimum.

H-P-M die casting machines have a lot to offer for your production, too. Investigate thoroughly the advantages of these new machines. You won't have to pass up the tough jobs. Put them on an H-P-M . . . profitably! Call in a nearby H-P-M engineer or write for Bulletin 5700, today.

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BOOKS

continued from page 24

MAGNESIUM CASTING TECHNOLOGY, By A. W. Brace and F. A. Allen, Reinhold Publishing Corp., New York, N.Y. Price $4.95

The successful production of magnesium alloy castings requires special foundry techniques. This is necesssary because of the physical and chemical properties of the metal. To understand magnesium casting practice it is necessary to have a working knowledge of these particular properties. By providing this understanding, the authors hope to encourage more foundries to undertake the casting of magnesium.

Each chapter presents a different phase of the magnesium story. Numerous tables, charts and photomicrographs aid in this technical presentation. Individual chapters deal with the Magnesium Casting Alloys; Gravity Die Casting; Pressure Die Casting; heat treating; inspection, and surface treatment.

An objective presentation of British and American practice is furnished against a background of the more basic chemical and physical properties of the metal.

FASTENERS HANDBOOK, By Julius Soled, Reinhold Publishing Corp., New York, N.Y. Price $12.50

The "Fasteners Handbook" provides pertinent data, illustrations, and full page descriptions on all currently available fasteners. You can select the fastener that meets your requirements because the book includes all standard and proprietary fasteners. This includes the many specialized fasteners that have been developed since World War II.

The book is unique in that it is the only source that relates the actual uses of fasteners in one field to those in another. Each fastener is described on a separate page which includes an illustration of the fastener and paragraphs headed: Description, Features, Uses, Standard Materials, Standard Sizes, Remarks and Manufacturer.

This book provides concrete examples of money-saving applications for all designers and manufacturers.

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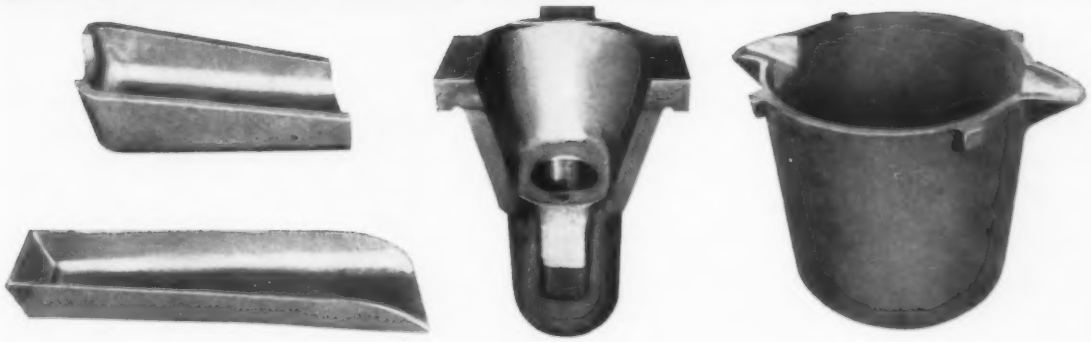

Here's another industry first! Dodge now offers an *individualized* service for the manufacture of a wide variety of die-casting parts and accessories, each *custom-made* of long-lasting steel. If your needs include goosenecks, interliner and melting pots, pouring spouts, plunger pullers, chutes, pistons, tapered nozzles, skimming pots, etc., we'd be happy to quote on your requirements. How may we be of service?

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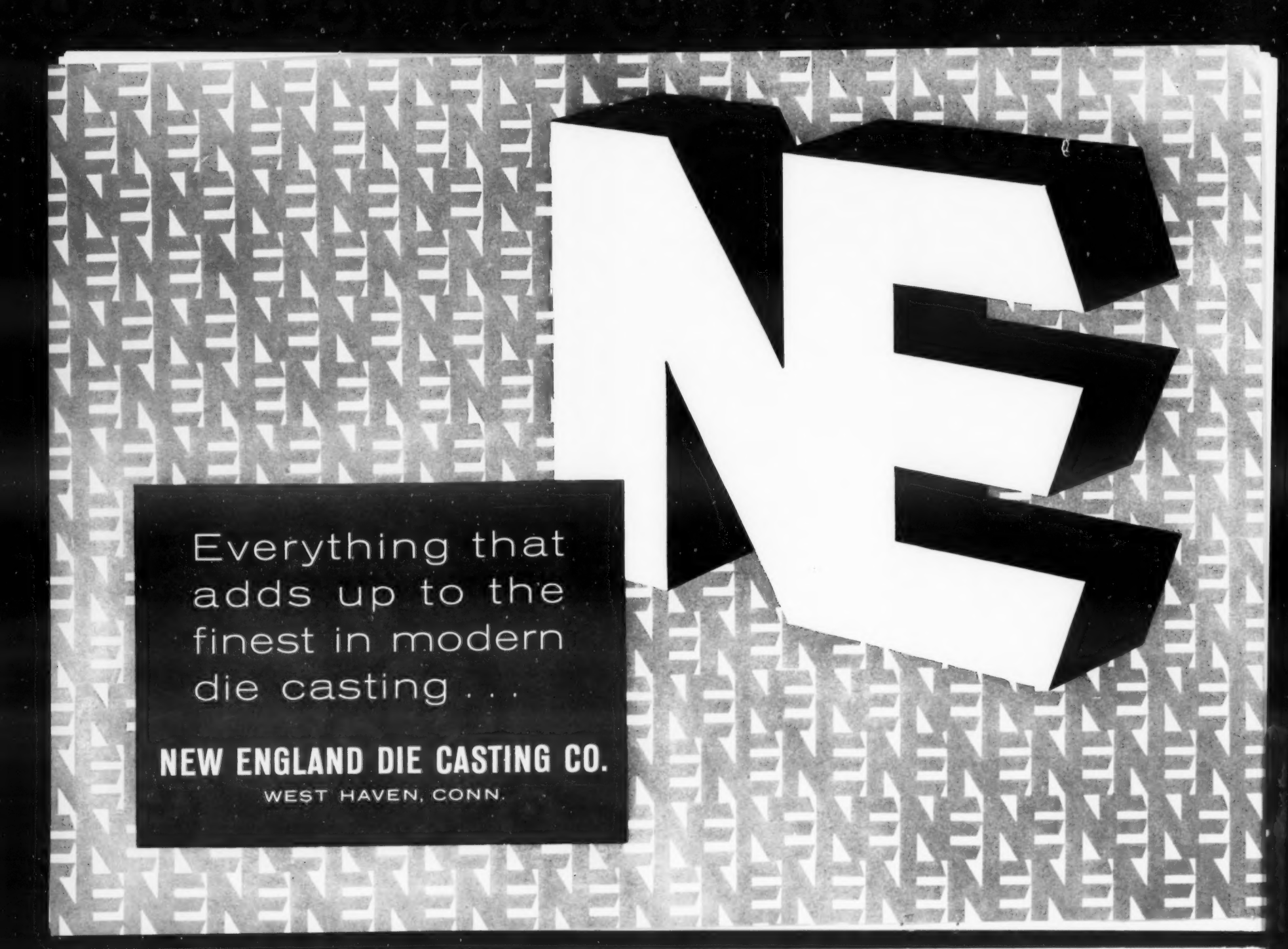
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Everything that adds up to the finest in modern die casting . . .
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IDEA file!

for designers, materials engineers and buyers

WHAT IS AN IDEA FILE?

When a design or production engineer selects a particular method to make a part, he generally associates the new part with one he has made before or has seen somewhere.

The most common association is with a part that has been pictured and described in the trade literature. Because this is true, this issue of PRECISION METAL MOLDING shows many examples of parts made by various precision molding processes. To help the association of ideas is an IDEA FILE.

IS AN IDEA FILE NEEDED?

Every year about 30% of all engineers change jobs. This includes engineers just graduating and starting on their first jobs. Also the continual development of new products poses new problems in design and production. This change requires continual education if good products are to be made inexpensively. An IDEA FILE is a help in this continuing education.

IS THERE REALLY A CHOICE?

Probably there is no "best method" of making anything. Plants, practices, policies, tools, the number of parts to be made and even personal feelings enter in.

Function often dictates the material of which a part is made. If, for example, a ferrous base alloy is needed then die casting, permanent mold casting, and plaster mold casting can not be used.

If the number of parts to be made is small, the cost of tooling for either powder metallurgy or die casting will probably be too high. However, permanent mold casting, investment casting, plaster mold casting and shell mold casting may be used.

Even when large numbers of parts are to be made, die casting, permanent mold casting and all of the other precision forming methods should be considered. The choice will probably be dictated by the cost of machining that follows the molding.

So there is nearly always a choice of methods of manufacture and a careful study is required.

HOW IS A METHOD SELECTED?

There is only one certain method to select a method of manufacture. Where quality is equal, the method giving the lowest cost part at assembly level is the one to use.

Three common errors are often made when materials and methods are selected. Many parts are overdesigned. When an aluminum or zinc casting would be adequate, steel is specified only because the designer thinks of steel.

Dimensional tolerances are frequently specified tighter than needed. High cost is the result.

Finally failure to get the advice of a specialist is costly. Whenever there is any question, consult a reliable fabricator. His business is to make good parts as economically as possible. By slight changes he may be able to save you money.

Are Your Cost Comparisons Accurate?

THE comparison of various manufacturing methods is not always an easy matter. Many factors enter into such an evaluation and unless the person making the comparison is skilled in this work, errors are easy.

Probably the most common mistake made in this type of work is comparison of costs at the wrong level. If, for example, a part made as a sand casting is to be compared with the same part made as a permanent mold casting the simple, and wrong, method is to balance piece costs at the receiving dock. Even if tooling is added to these piece costs the answer will be wrong. Why? Because it is seldom that a sand casting can be used as received. In nearly every case some machining must be done on the casting before it can be considered ready for assembly.

It may be that both castings will have to be machined, but it's a safe bet that far less machining will be done on the permanent mold casting than on the sand casting.

Another point often overlooked in cost comparisons is scrap loss. Blow holes, inclusions, internal cracks, gas porosity and other defects are frequently uncovered when a sand casting is machined. These defects can be adequate cause for rejection. Of course, the foundry replaces the scrapped part and there is a minor salvage from the sale of rejected metal. But who pays for all of the costs of machining, stocking, inspection and the overhead associated with all of these expense items? Your company. Should rejected castings, or other parts, result in a production delay the cost can become excessive.

But other savings are often possible when one of the precision molding processes is used. Many parts are presently made, or designed, as a series of minor pieces that must be assembled by welding, bolting, riveting, brazing or other methods into the final part desired. By careful design and evaluation it is often possible to make a single part by one of the precision processes that eliminates all or part of these assembly operations.

To help in making the best comparison of costs, the following table has been prepared. The table has been prepared after consultation with value analysis men who have found that the items listed will, in most cases, give a fair cost comparison. Whether or not general overhead is included in these cost items will depend on the accounting practices in each plant, but it may never be ignored if an accurate cost comparison is to be secured.

COST BALANCE SHEET

	Old Method	Die Casting	Perm. Mold Casting	Investment Casting	Powder Metallurgy	Shell Mold Casting	Plaster Mold Casting
Cost of semi-finished part, delivered							
Cost of tooling							
Raw materials							
Jigs & fixture for second operations							
Raw material stocking							
Total machining costs							
Finished material stocking							
Cost of maintaining inventories							
Incoming material inspection							
Intermediate inspections							
Heat treating							
Surface finishing							
Capital expenditures							
Sub-assembly costs							
Total scrap losses							
Final inspection							
Total Costs							

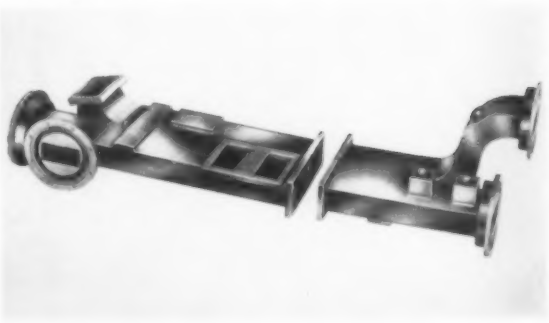
CONTROL INSIDE DIMENSIONS BY BOLTING PLASTER CORES TOGETHER . . .

with hidden studs and nuts. The cores are first prepared in separate sections then joined.

This method is fine for making large units such as the short slot hybrid duplexer seen here.

This unit shows the good electrical and mechanical characteristics which can be had. It is cast in two separate 356 aluminum sections with a total length of 45" and a weight of 17 pounds.

The cross-section dimensional tolerance is plus or minus .003" on the E-plane, and plus or minus .002" on the H-plane. The part also has been produced with an inside surface of 65 rms.



TOLERANCES HOLD TENSION BETWEEN DIE CAST BASES AND HEADS . . .

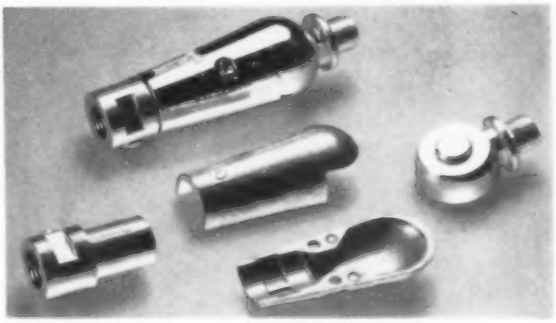
and make the dissembled swivel seen here a very important part of modern lamp manufacturing.

The completely assembled swivel is beside the die cast parts which are placed in the approximate positions they occupy in the finished assembly.

Service conditions demand that tolerances be kept within .005".

These parts lend themselves admirably to the zinc die casting process.

Advantages are: high speed of production of the parts, the close tolerances produced in the process, and simplicity of assembly and finishing.



SHELL MOLDING REDUCES CRANK-COST ABOUT SIXTY PERCENT . . .

because an expensive series of finishing operations have been eliminated as have a series of fabricating steps which are now unnecessary.

Formerly a screw-machine part riveted to a forging, and with machined teeth, this service gear handle for an accounting machine is cast in a shell mold. Its purpose is to line up the machine's mechanism in proper positions for inspection, maintenance, and repair.

Today the part is turned out in its final form except for polishing and wire brushing. Tolerances on outside teeth are plus .01" and minus zero.

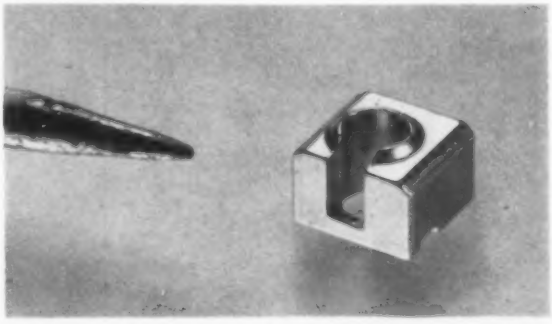
AN EXAMPLE OF A SINTERED PART IMPOSSIBLE TO MAKE ANY OTHER WAY...

is this flint locater which is assembled into many cigarette lighters.

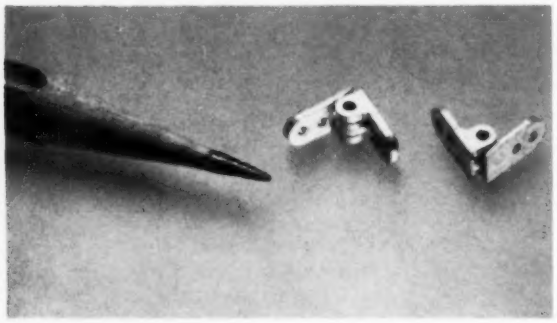
The square block is mechanically crimped into the lighter case by the two slots seen on the side. Flint is pushed up through the hole by a spring-loaded arm under tension.

The part is single-pressed and through hardened so that it is file-hard. It can be plated or black-oxidized easily. Fabricating it by any other process would be difficult.

The locater is made of pure electrolytic iron and has a density of about 86%.



NICKEL-SILVER IS ELIMINATED IN A SINGLE CASTING OPERATION . . .



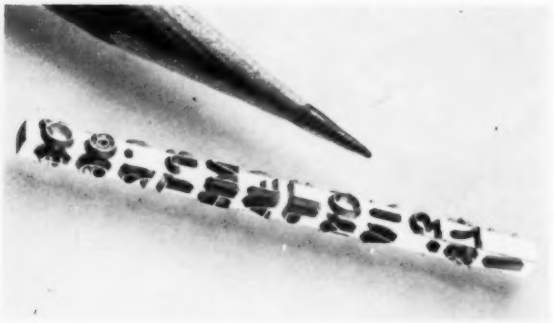
when these eye-glass hinges are die-cast in zinc. There were several other advantages gained when the die casting operation was specified.

Besides removing the need for nickel-silver as a vital material in making the hinges, the operation also eliminated half a dozen machining operations. Cost cuts resulted from these benefits.

This is an excellent example of the intricate and detailed parts which are being die cast in zinc and used in place of machined pieces.

Savings in production time, labor costs, material-waste, and machine-maintenance are gained.

INVESTMENT CASTINGS ARE DEPENDED ON FOR ACCURATE FIGURES . . .



when smooth detail is needed for reproduction. This type bar is part of a printing apparatus which is investment cast.

It is cast with a finish that needs no additional machining.

The bar is one and three-fourths of an inch long and has 46 sharp letters on its surface.

This includes characters and numbers. The bar is cast in beryllium copper from a styrene pattern.

It has saved its user a vast amount since it has been produced by the investment casting process. Machining costs would be prohibitive.

PERMANENT MOLD CASTING 31 POUNDS LIGHTER THAN SAND CASTING . . .

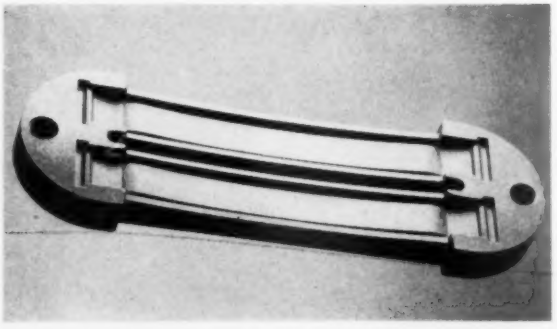
used before the casting's user began investigating a more economical method of fabrication.

The business machine base was converted from a grey iron casting. Many advantages were realized. The most important of these was a reduction in weight from 51 pounds to 14 pounds.

When the sand casting was used, a quarter-inch was needed for finishing stock. The aluminum permanent mold casting needs a thin allowance for finishing. It is three sixty-fourths of an inch.

The permanent mold casting also has freedom from porosity which allows a polish-finish.

NO MORE REJECTS SINCE SWITCHING TO SINTERINGS FROM CAST IRON . . .



in the manufacture of valve retainers for refrigerator compressors.

The parts, when made of cast iron, had many imperfections. This led to a high number of rejected parts which was a costly loss to the manufacturer of the refrigerator compressors.

And so makers of the valve retainer investigated more economical processes. The best qualified was the sintering process.

Since making the retainers of sintered metal, there have been no rejections. The only finishing operation needed is tapping the bolt holes.

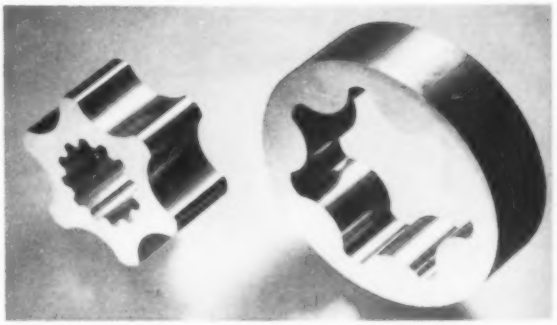
SINTERINGS REPLACE PARTS MACHINED FROM STEEL AT HIGH COST . . .

and save added expenses once used for machined parts because of the many secondary finishing operations needed to complete them.

The parts are used in high pressure pumps. They are now made from sintered metal and the cost reduction is approximately 50%.

Added to the benefit of eliminating time and labor costs of the machining operations, the manufacturer has also rid himself of much of the maintenance costs of finishing equipment.

Sintered parts operate at high pressures. A clearance of .003" is held between parts without machining.



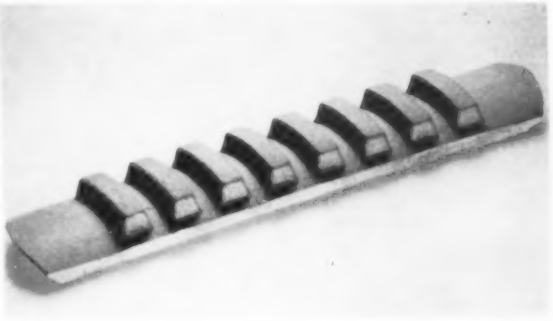
A SHELL MOLD CASTING REPLACES A PIPE-STOCK PART AT LESS COST . . .

because many secondary operations have been eliminated. Seen in the illustration is a rack which is designed to clamp an automobile wheel down on a tire changer when punctures are repaired.

The rack is cast in .25 carbon Max. steel to give it weldability as well as strength.

The one-eighth inch section as well as the rack's teeth must be held to a close tolerance.

This part was formerly made from a heavy pipe-stock which was threaded and then cut into the proper segments. A considerable saving resulted from the switch to shell mold castings.



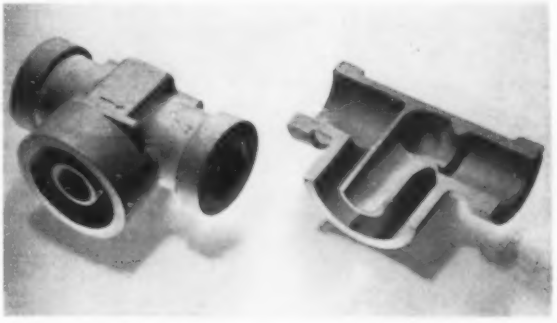
COSTS WERE CUT 400% BY USING INVESTMENT CASTINGS FOR VALVES . . .

in aircraft. These hydraulic aircraft valves were designed so as to operate when subjected to pressures as high as 3000 psi.

The part, seen in cross section in the illustration, is investment cast in 17-4 PH to a tensile strength of 180,000 psi.

The valves were once made in a very costly manner. This consisted of machining them from solid bar stock to close tolerances.

The inside orifices and passageways which can be seen in the cut-away section are now inexpensively made with coring.



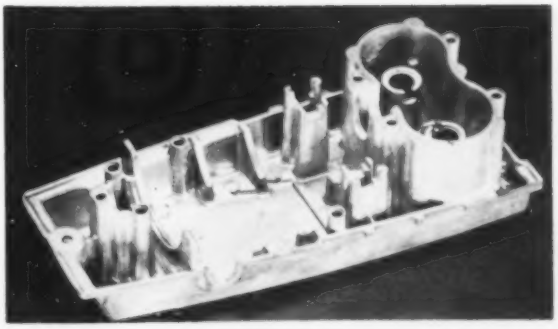
BRUSH HOLES AND SPHERICAL BEARING BOXES ARE CAST IN PLACE . . .

in this housing designed for use in easy manufacturing of electric mixers.

The part is more than a housing. It is actually a single-assembly die-casting which was once made of several separate parts.

As the reader can see, the part incorporates all the mountings for a motor and gear drive in one single die casting.

Because the holes and bearing bosses are cast, machining operations are no longer needed. The area used as gear box housing is at the end of the casting, making it lightweight and compact.



NO MACHINING IS NEEDED ON THIS PERMANENT MOLD CASTING . . .

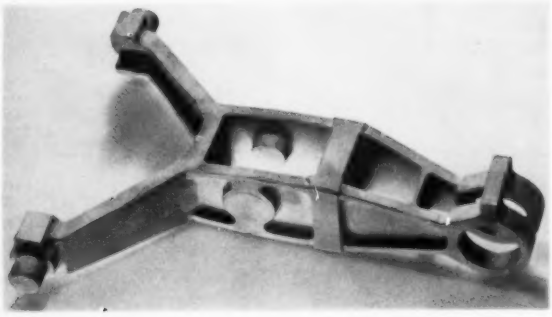
which has been converted from a part that was formerly a sand casting.

The main reason for the change over to the precision casting process was to do away with the necessity of many costly machining operations which made the manufacture of this bevel gear an unprofitable business program.

The permanent mold casting process was selected because it produces a casting made to precise tolerances with a minimum of scrap.

The final result was satisfying because all machining operations were eliminated.

INVESTMENT CAST BOMBER CONTROL LINKAGE-ELEMENTS ARE . . .



made of #410 S.S. They are heat treated so as to withstand a tensile of 180,000 psi.

These parts are the result of a great amount of study. The development of the linkage element resulted in this dependable, accurate investment casting.

It meets the rigid structural requirements of aircraft parts made to government specifications. The castings are put through exacting tests. Inspection includes all types of flaw-detection.

They are also subject to the revealing check of a 100% X-ray inspection and receive a magnetic particle inspection. Walls must be .060" thick.

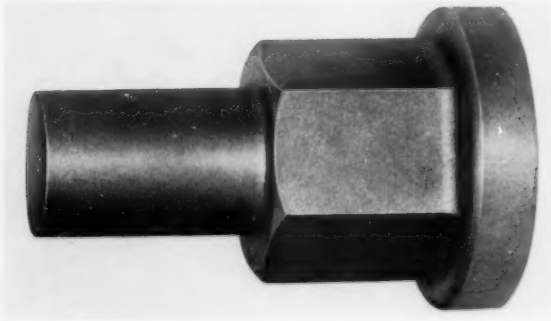
SINTERINGS MAKE LONG-LIFE PARTS ONCE PUNCHED IN BRASS . . .

like the ratchet gear and pawl set made of powdered metal which is illustrated here.

The pawl was once blanked from brass stock on a punch press, then shaved all around and drilled. Cost of producing one pawl was approximately sixteen cents.

These parts are now fabricated from #4600 steel by the sintering process. The sintered ratchet arrangement now outlasts the unit on which it is placed. Once it was considered the weak spot of the entire assembly. Economy of production is gained also, since each pawl now costs only three cents.

THERE IS A MINIMUM OF EXTRA METAL ON SHELL MOLD CASTINGS . . .



that is most apparent when involved parts such as this coupling nut casting with high conductivity are manufactured and sold.

The hexagonal body of the nut could not be made as economically by any other means.

The wide end of the casting has a shallow flange that is easily cast. If machined, this would add a great deal to the cost of the part.

The surface finish is excellent and of a very high quality. All tolerances are strictly specified and must be held from plus or minus .015" to plus or minus .020" or parts are rejected.

Photos courtesy McCulloch Motors Corp. Left: portion of die casting plant. Center: die casting operation. Right: close-up, die with casting of engine cylinder.

Lower cost die-casting in light-weight metals

Performance records in Die Casting Division of McCulloch Motors Corp. reveal new die lubricant with higher price-per-gallon actually yields lower cost-per-casting.

McCulloch Motors Corp., leading manufacturer of chain saws, die casts over 100,000 pounds each of magnesium and aluminum, monthly, in their own die casting plant. Rigorous analysis of cost and performance for various lubricants revealed that initial cost-per-gallon does not provide true index of die lubricant cost. NO WELD die lubricant is now used extensively throughout the McCulloch battery of 15 die casting machines, despite its appreciably higher cost per gallon, because decrease in downtime and decrease in reject rate more than offset higher initial cost.

New die lubricant

NO WELD, a new die lubricant, ejects castings without welds or solders. It cures dies, and prevents adhesion of aluminum, magnesium, and zinc alloys.

Because of the performance characteristics of the metals under conditions of heat and pressure, die castings in aluminum, magnesium, and zinc alloys often tend to weld to the die, and consequently make ejection difficult. In many such cases, the use of conventional die lubricants as a mold-release agent is not sufficient to correct the problem.

NO WELD, specifically compounded to prevent welds in die casting aluminum, has been found equally effective for magnesium and zinc. This new die lubricant maintains operational efficiency in temperatures up to 750° F.

Shoots out welds

In addition to functioning as a die cure and mold-release agent, NO WELD may be utilized as a flux to shoot out welds which have adhered to cavities in the mold. When welds have been completely removed, it is advisable to cure the complete mold with NO WELD, preventing recurrence of welds.

Each gallon goes farther

Priced at $12 per gallon of concentrate, $10 per gallon in volume quantities, NO WELD's economy derives from several facts. Each gallon of concentrate makes 8 to 16 gallons of lubricant. And comparative tests indicate NO WELD goes two to four times as far as other mold-release agents.

But the true measure of lubricant economy consists in the decrease in rejects, and the decrease in downtime on the casting machines

Basic cost analysis proves for mold release of aluminum, magnesium and zinc die castings, NO WELD provides effective, dependable performance, at minimum operating cost.

Write today, on your letterhead, or use convenient coupon, for free sample, or trial order.

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City and State _____
Name of Individual _____

For more information circle No. 50 on the Reader Service Card

THIS PART IS PRODUCED FROM PURE SILVER IN COMPLETE DISREGARD . . .

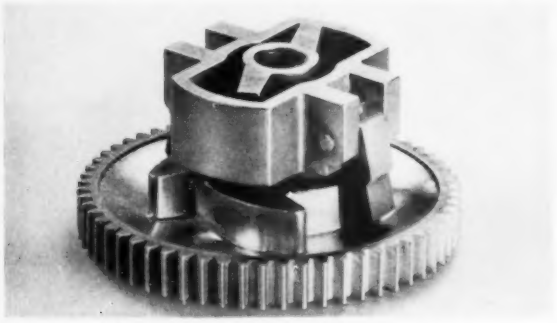
of normal casting practice. The relatively small component gave the designers and engineers a pair of problems. These involved both a conductivity problem and a thermal one.

The item is a laminated commutator and it is cast as an integral part of a die casting.

This is an example of the positive results produced when technical people tackle a problem involving several factors, all of which can be resolved by the die-casting process.

Using pure silver was possible only after careful analysis of equipment capabilities.

SINTERED CLUTCH ASSEMBLY IS PART OF AN ELECTRIC STARTER . . .



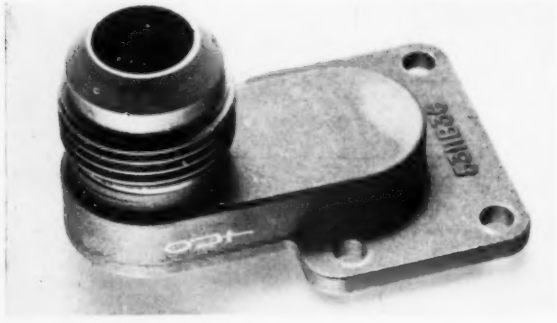
for powered lawn mowers with up to three-and-one-half horsepower.

The parts are made from copper infiltrated iron, IPM grade IC-752, which meets SAE specification #7 on powdered metals.

These parts have a tensile strength of approximately 90,000 psi.

Once the gasoline-powered mower-motor fires, its RPM is greater than that of the starter-motor. Centrifugal force causes the pawls to lift out of position, disengaging them from the cam on the electric starter-motor's clutch-gear.

VALVE PART IS INVESTMENT CAST FOR LIGHTNESS AND STRENGTH . . .



in order to resist the pressures met in regulating airflow. Used in an anti-G suit valve, this elbow is designed to overcome the effects of acceleration on the pilot of highspeed aircraft.

After examining all possible means of mass producing the part, the manufacturer's engineers chose the investment casting process because it met the exacting government regulations. These covered weight, rigidity, and unit construction cost.

The elbow is now investment cast in #356 aluminum alloy as a complete unit. This insures rigidity and eliminates assembly problems.

PLASTER MOLDS AND CORES ALLOW A WIDE SCOPE OF DESIGN . . .

as can be seen in the timer-pump intake-port cast in high strength manganese bronze.

The alloy used is resistant to wear and hardens with use. Using the plaster mold and vacuum casting process, a heavy hub is cast in a base which is one-sixteenth of an inch thick and three-eighths of an inch in diameter.

A minimum fillet is used on the reverse side. The half-inch channel is cast without fillets.

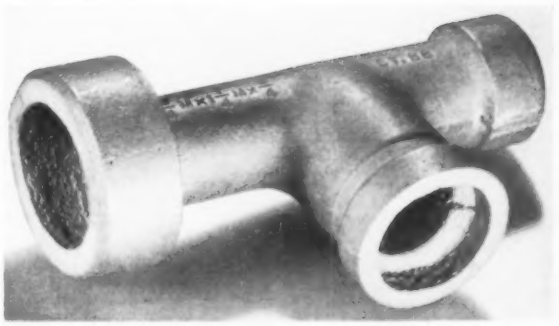
A high-production, one-piece core is used on the court areas. A lathe cut on the outside diameter and the hub were the only finishing operations.

RED BRASS PARTS ARE EASILY CAST IN PRECISION-MADE SHELL MOLDS . . .

because many other processes were tried out and for some reason, only shell molds seem to give the most satisfactory results.

Casting in brass presents the designer with a corrosion problem. The T-fitting seen here is used to connect underground fuel-gas lines and is thus exposed to a corrosive environment which red brass will resist.

When casting the first few fittings, swelling distorted the end, making it oval. This was corrected by increasing shell-weight and raising the pouring-temperature. Scrap loss is held to a low of 9%.



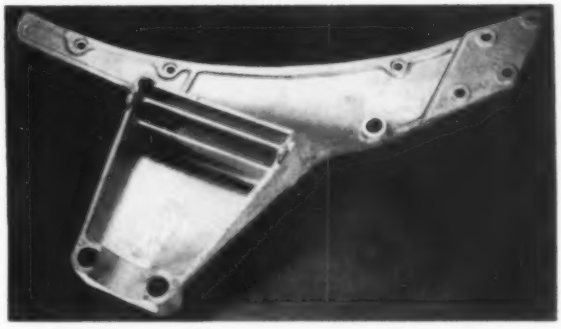
PERMANENT MOLD CASTING HOLDS TOLERANCES ON CONTOUR . . .

that must match a duplicate casting. This slip-fitter is one of a pair of duplicate parts cast for right and left hand applications.

The aluminum permanent mold castings are used to support a highway luminaire under heavy stress. They are cast from a high purity 356 alloy.

The parts develop a tensile figure of 40,000 psi and have a 10% elongation.

One of the most important aspects of this permanent mold casting is the fact that it holds the difficult tolerances on matching contours. All holes are cored, eliminating any need for machining.

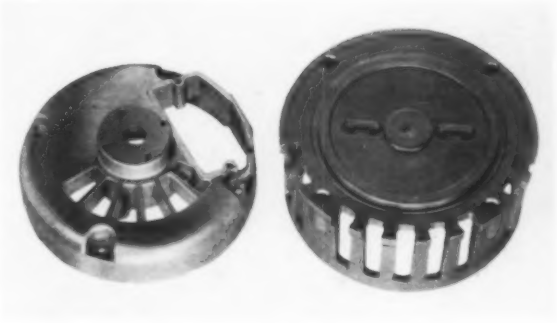


DIE CAST ALUMINUM MOTOR BRACKETS REPLACE CAST-IRON PARTS . . .

are end brackets for electric motors. The change-over to an aluminum die casting produced these end brackets at a more economic level for their manufacturer.

Because of the close tolerances which can be held when the die casting process is used, the designers and production people were helped in eliminating some of the costly machining operations.

It is apparent that the end product was also improved. This betterment was possible because of the surface quality of die castings. The smooth finish enhances the appearance of the parts.



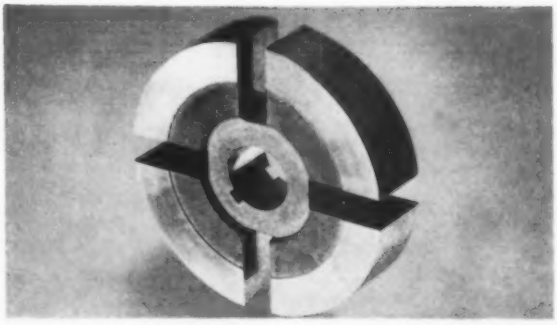
SINTERINGS REDUCE COST AND INCREASE LIFE EXPECTANCY OF ROTORS...

such as the pump rotor illustrated in the photograph. It is sintered to very close tolerances which are needed to deliver pressure as well as volume when the pump is used.

Life expectancy is increased when this part is sintered in powdered bronze. The material is oil-retaining and gives life-long lubrication if needed.

Before switching to the use of sinterings, the rotor was machined completely and was very costly to maintain.

The net result of the new process is that greater efficiency and economy have been gained.



PLASTER MOLD CASTINGS CAN BE PRODUCED WITH GREAT ACCURACY . . .

such as is the circular feed roll illustrated in this photograph. It has several vanes or louvres and is designed to very close tolerances.

This part is made in T4 aluminum. It has a tensile strength of 42,000.

Its yield strength is specified at an impressive figure of 22,000.

The calculated elongation in a space of two inches is described as 12%.

The user need only drill a hole and machine a keyway, afterward the part is dynamically balanced for even greater accuracy.

"UNCASTABLE" DIE CASTINGS CAN BE CAST BY USING SPECIAL CORES . . .

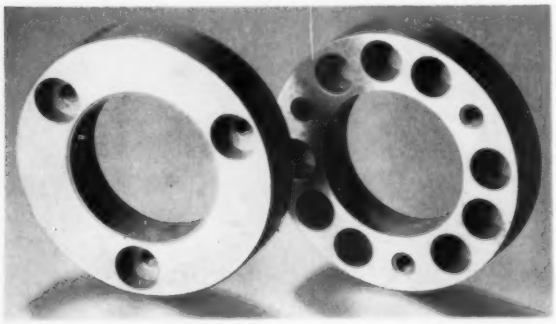
to turn out intricately undercut parts such as the sample illustrated at the right.

This apparently "uncastable" undercut is formed by a core running under the impression. The reader can see part of the cored undercut by examining the inside of the part's left arm.

Used as a tube-cutter frame, this item is an impressive example of the wide versatility of the die casting process.

These special cores can be used in various ways to turn out other parts. The term "uncastable" is often used prematurely.

SINTERINGS HAVE SPECIALIZED APPLICATIONS AS POWER STEERING . . .



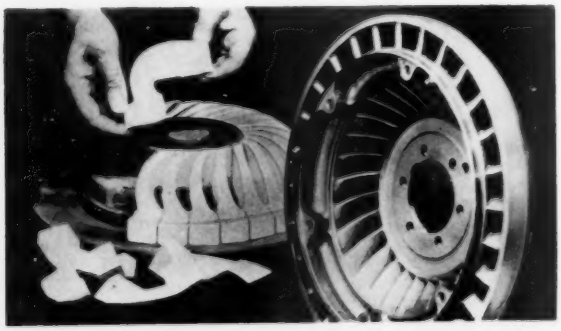
parts composed of MI-5-B, a medium steel grade of powdered iron.

This part has nine blind holes from one side. These accommodate springs. On the opposite side are three counterbored holes. Three holes are tapped for bolts to round out finishing operations.

The manufacturer delivers this part to his customer with tapping operations completed and a thickness tolerance of plus or minus .0005" on the overall part-thickness.

Cost savings to both manufacturer and customer are very appreciable.

PLASTER MOLDS CAST INTRICATE AUTOMOTIVE COMPONENTS . . .



that are quickly precision-produced in these molds when used with accurately made plaster cores. Both are used in the production of detailed parts such as can be seen in the photograph.

The plaster cores seen at the left of the picture are essential to the production of the finished plaster cast part.

This piece, seen at the right of the picture, is an intricate automotive torque converter. It is made of aluminum.

Blades on the converter are precision formed by the plaster molds seen at left.

SINTERINGS CAN MAKE IT POSSIBLE TO PRODUCE PARTS COMPETITIVELY...

because overall costs are lower. Illustrated in the photograph is a bevel gear for a power differential. This precision sintered part is made from copper infiltrated iron and is formed to close-dimensional accuracy at low cost.

Careful calculation disclosed that the part is being sintered at a saving of 62% when compared to its machined counterpart.

The only secondary operation needed on the sintering is the reaming of the bore to meet a tolerance of plus or minus .0005". The gear is two and one-sixteenths inches in diameter.

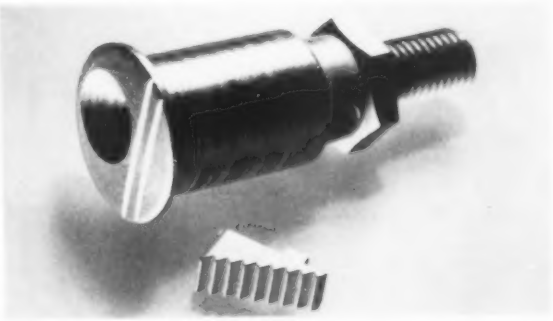
INVESTMENT CASTING IS IDEAL FOR QUANTITY PRODUCTION METHODS . . .

when parts such as this lock cam are being manufactured. The part is designed for use on a locking mechanism to clamp telephone wire on a portable telephone switchboard.

In operation, the terminal plug is depressed, spreading both cams. When released, the spring-loaded mechanism clamps teeth, securing the wire.

Cams are investment cast in stellite for better wear resistance. A maximum average radius of .003" is held on the teeth for best clamping action.

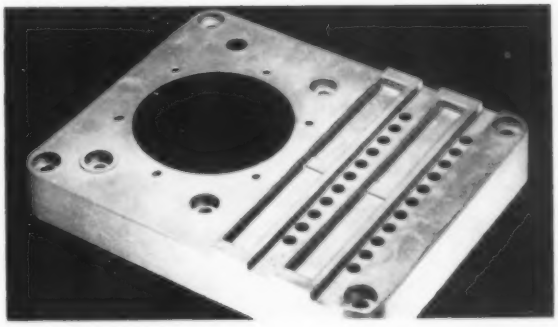
Tolerances are held to plus or minus .001". Selling price is less than eight cents per casting.



DIE COSTS ARE LOWER FOR MANY PERMANENT MOLD CASTINGS . . .

especially the aluminum base for a United States Navy electronics communicator unit seen in this unusual illustration.

The permanent mold precision casting process was selected only after a careful study had been made of other methods. These studies were given a detailed cost analysis and it was proven beyond a doubt that the permanent mold casting method was the most economical means available. Added to these benefits were others such as the fact that the permanent mold casting presents a cleaner appearance and that holes can be cored.



CORING FROM THREE SIDES MAKES A UNIQUELY DESIGNED DIE CASTING . . .

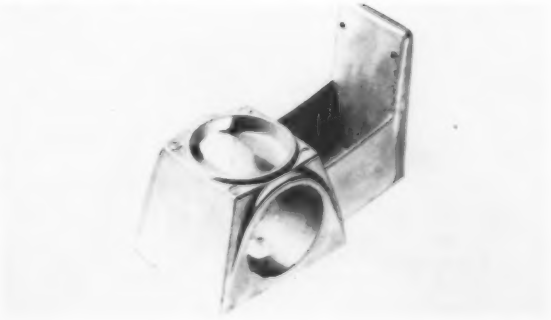
which is used as the main part of the microscope body seen at the side.

This aluminum die casting is an outstanding example of die casting at its best. It has excellent, intricate detail.

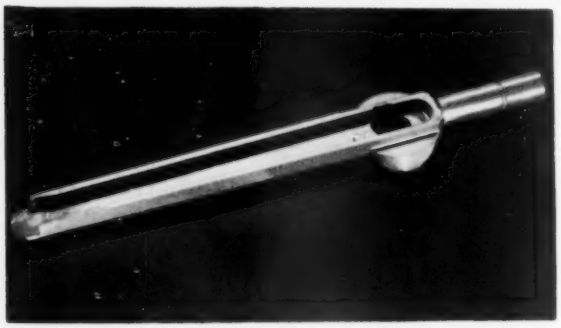
Its contoured surface is reproduced exactly as the designer specified.

The part is manufactured quickly, with a minimum of finishing and checking. The fact that it is cored from three sides is evidence of fine die design.

Another added benefit of the die casting process is the excellent hardware finish obtained.



IF STRENGTH IS NEEDED, IT'S FOUND IN A PERMANENT MOLD CASTING . . .



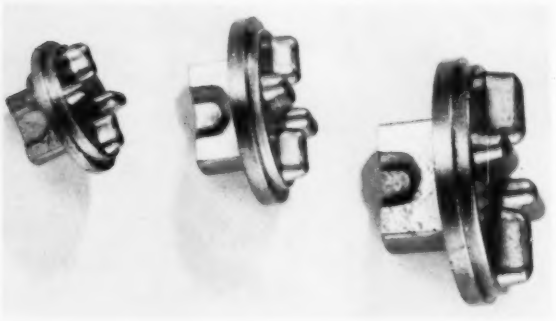
like the one designed for the aluminum torque wrench frame illustrated here.

Most of all, this part needs the density and strength to be found in the high grade permanent mold casting that is available for such work.

Lack of porosity contributes to the needed density of the casting.

Together with these other characteristics, the permanent mold castings offer the user of the torque wrench frame such benefits as fine finish and low cost. This gives him a better part at a much lower capital outlay.

SELECTION OF SINTERINGS ELIMINATES SECONDARY OPERATIONS . . .



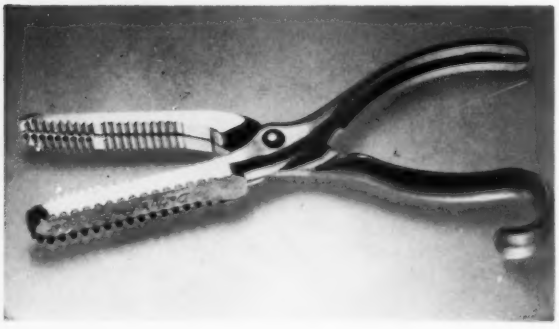
which are expensive and add to the final cost of the precision-made parts.

Called shifters, these parts are important items in a new socket-head wrench manufactured in three separate sizes.

Because of the design of the parts and their physical needs, more than one process of fabrication was possible but only the sintering process gave a precision part at the lowest cost.

The shifters are made of copper-infiltrated iron. They are one-and-one-fourth inches, seven-eighths of an inch, and five-eighths of an inch in diameter.

OFFSET GRIPPING TEETH CAN BE MADE ONLY BY DIE CASTING PARTS . . .



used to make the all-die cast fish gripper. Sportsmen use it to hold their catch after landing it in the boat or on shore.

Die casting is best because the gripping serrations and scaler-teeth are cast sharp enough to serve their purpose well.

No other method could give these characteristics and features without needing many, expensive machining operations.

Holes for assembly of the two halves of the gripper are die cast in location. This makes sure of perfect alignment of the teeth.

INVESTMENT CASTING PERMITS THE USE OF SILICON-BRASS . . .

which increases the operational-life of the piece by approximately 300%.

This indexing-cam seen at the right is used in a printing machine.

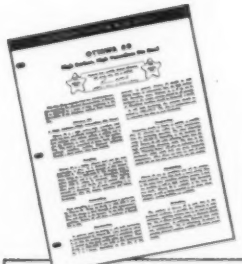
It was once made by brazing 17 soft brass stampings and a screw-machined shaft.

But investment casting the piece as a single, integrated part made it possible for the designer to gain an impressive weight reduction of 50%. The cost-saving was over 90%.

These gains in life, cost-saving, and weight reduction are possible by investment casting.

These OTTAWA 60 DIES PAYOFF BIG IN 3 WAYS

- ★ Buffing Time Reduced ½
- ★ Rejects Reduced 20%
- ★ Stoning and Regrinding of Dies Reduced 75%



Write for BLUE SHEET on OTTAWA 60

This concise four-page folder gives all needed handling and shop treatment details on Ottawa 60. Included is certified laboratory information on physical characteristics, and complete data on forging, annealing, hardening, tempering, etc. *Ask for your copy.*

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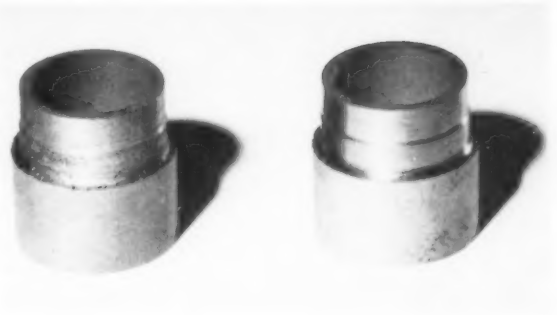
THE RIGHT ALLOY FOR SINTERINGS MEANS LOWER MACHINING COSTS . . .

when it is carefully selected and tested. The undercut bearing illustrated in the photograph is one-inch, by one-and-one-quarter inches, by two inches.

It is pressed into the transmission housing for large machine tool application.

The problem of the designer was to get a readily machinable material. He finally selected FM-2 *Powdiron* and the machining rate was triple that of any other material.

The added improvement in the part-machining rate saved the user approximately 45% of the total cost of the undercut bearing.



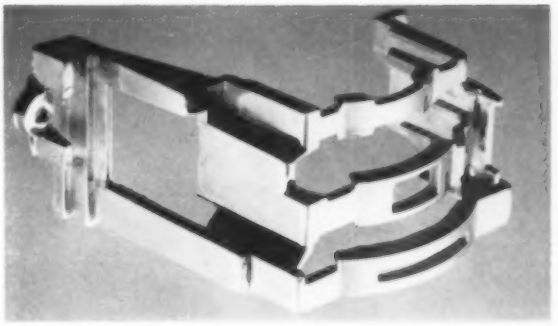
A DIE CASTING HOLDS LENSES IN 3 POSITIONS WITHOUT MACHINING . . .

is the purpose of this die cast aluminum lens mount used in a new, modern home projector.

It is a very complex part and is cast to extremely close tolerances.

Die casting was selected as the original manufacturing process because no other method would produce such a complex casting as this, in mass production at low cost per piece.

Aluminum was chosen as the metal used because of its light weight, added strength, dependable rigidity, over-all part and component uniformity, and characteristic resistance to high temperatures.



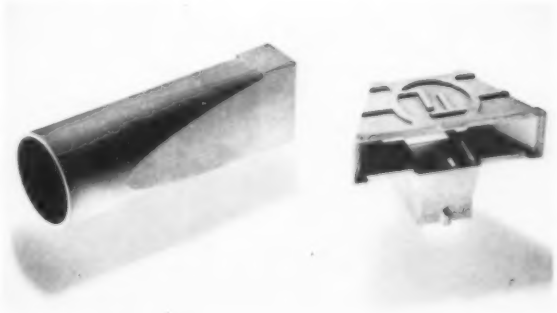
INVESTMENT CASTING'S WALLS ARE MAINTAINED TO A LOW OF .040 . . .

when electronic parts are made. Seen in this illustration are two parts used in wave guide plumbing. They are precision investment cast in beryllium copper, 356 aluminum, and most dip-brazeable aluminums. Accuracy is a must.

Internal wave-guide-opening tolerances are held to plus or minus .003″ up to two inches.

As in most electronic parts, weight is one of the most important factors.

To reduce weight as much as possible, the makers of these investment castings have demanded that the wall thickness be held as low as .040″.

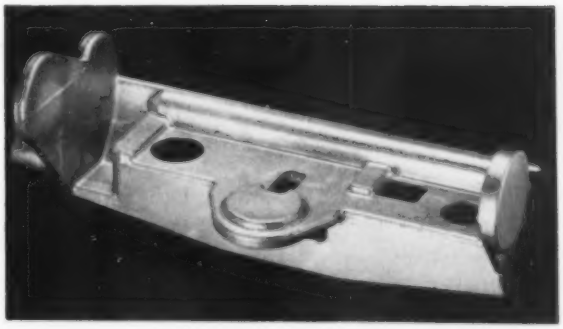


X-RAY CHECK OK'S THESE HIGH QUALITY PERMANENT MOLD CASTINGS . . .

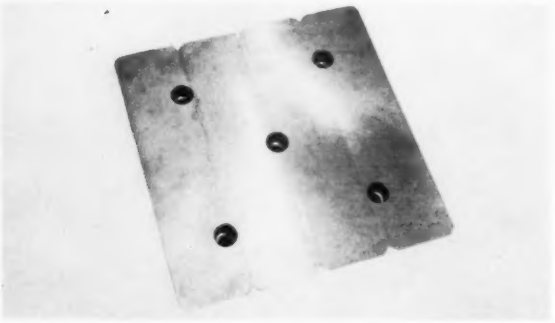
that are manufactured for use as aerial sextant trunnions. These parts are cast in aluminum and must pass the most exacting inspection before being accepted by the user.

Because the part has such intricate details in its design, the close tolerance aspect of the permanent mold process was specified.

But the trunnions were designed to be held to close, overall dimensional tolerances that would have called for excessive machining if sand castings had been used instead. The absence of porosity in permanent mold castings was also desired.



JOINED SINTERINGS MAKE NEW, MORE INTRICATE SHAPES POSSIBLE . . .



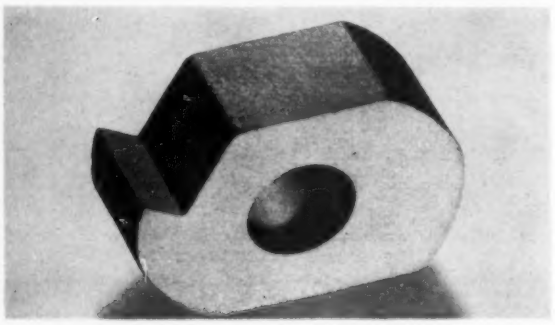
such as the giant-sized wear plate illustrated here. Its dimensions are: two inches, by twelve inches, by twelve inches.

By and large, the process has solved a number of tough bearing problems.

The wear plate was made by combining four smaller oilite plates to make a single bearing surface. This is possible when a new brazing process is used which utilizes silver solder bonding. Through it, any number of sinterings can be joined.

The large bearings are self-lubricating for life and can withstand continuous loads of 14,000 psi.

INVESTMENT CASTINGS HAVE 63 TO 80 MICRO-INCH SURFACE FINISH . . .

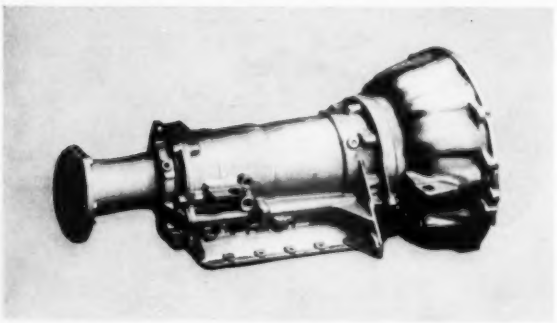


which has been found to be acceptable. The steel cam made of SAE 1085, gives precision control to a small lift truck.

This part was once made by milling and grinding the cam's contours. It was difficult to control the grinding operations. Tolerances needed for proper operation of the part were difficult for the machine operators and caused assembly problems for the truck's manufacturers. Investment castings were tried.

A dimensional comparison showed that the castings were closer to the optimum cam-relationship than the machined parts.

THIS 26-POUND PERMANENT MOLD CASTING IS A TRANSMISSION CASE . . .

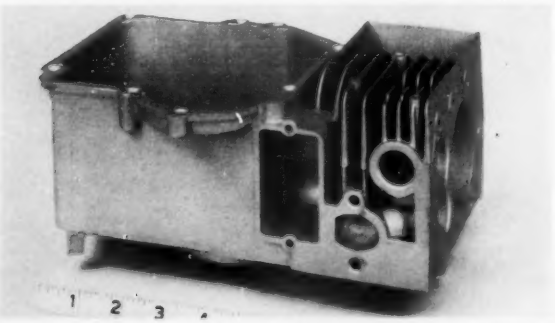


for the Buick automobile. The intricate detail and accurate contouring needed for a transmission case are readily available when the permanent mold casting process is used.

The great saving in the use of the casting is in the lowered machining costs which were a must when other methods of fabrication were used.

The transmission case is only one of the 74 aluminum parts used in the 1958 Buick. Its weight and size however, make it the heaviest, accounting for more than 30% of the overall weight of aluminum used in the automobile.

THIS MOTOR BLOCK IS A VERY INTRICATELY DESIGNED DIE CASTING . . .



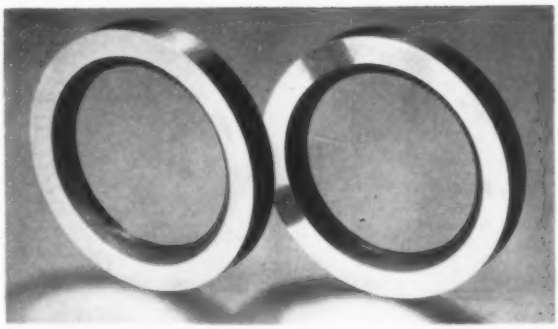
which would be impossible to manufacture and fabricate by any other means than modern precision die casting methods.

It is a prime example of what can be accomplished in the die casting field when multiple coring is used to its best advantage.

The portion of the ruler seen in the lower lefthand corner of the photo at the left will give the reader some idea of the casting's size.

Greatest contribution to this low-cost, easily made fast-production motor block is the carefully designed tooling used in the process.

THIS SINTERING MUST BE ABLE TO STAND A LOADING OF 100,000 POUNDS...



and the metallurgical specifications require a hardness of R/C 40/45 minimum.

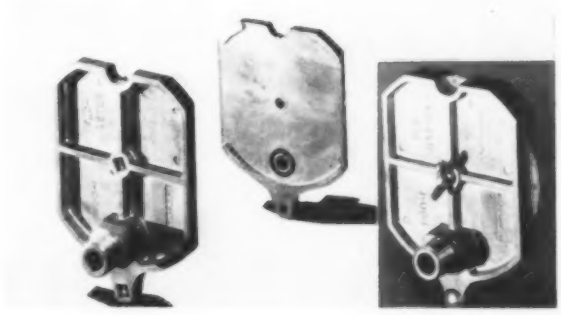
Because of their specific characteristics, these parts are made of MI-7-C which is a high carbon steel grade of powdered iron.

This material also has a subsequent heat treatment to add to its features.

Its purpose is more or less specialized, being designated for a high loading application in a truck axle.

Besides being able to withstand a loading of 100,000 pounds, it must also do it without .0001" permanent set.

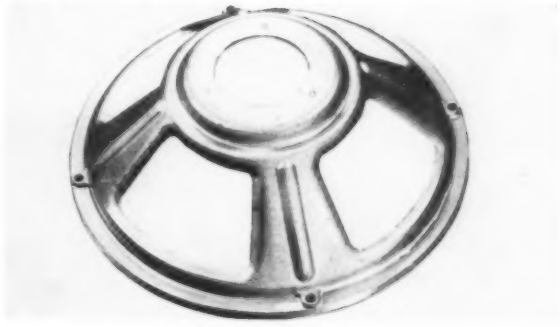
PAIR OF DIE CASTINGS HAVE THREADED ATTACHMENT PROJECTIONS . . .



and are ready for assembly. The threaded cast projections accommodate inlet and outlet attachments and a strainer. Together, these castings are for the body of a meter used to regulate ammonia-flow into irrigation water.

Close tolerances of the aluminum castings insure a close fit when they are mated in assembly. Cast flanges on one surface of the die-casting position the disc. The outer surface is cast with ribs and recesses. This minimizes the amount of metal used for each casting. Using die castings also allows engraved lettering on outer surfaces.

PERMANENT MOLD CASTINGS CAN ELIMINATE MUCH MACHINING . . .



when the low-cost, high-precision process is used on some parts. This hi-fi speaker frame illustrated in the photograph, is a permanent mold casting poured in aluminum.

It has many of the outstanding characteristics found in permanent mold castings. Among them are such things as rigidity, a must when fabricating a structural part like a speaker-frame.

Another is very important. This is the close tolerance which must be held on the overall diameter of the frame. Besides these, all holes are cast in the part. This eliminates any need for machining.

CONTRIBUTORS TO THIS IDEA FILE

Advance Tool and Die Casting Co.
Aerojet General Corp.
Airtron, Inc.
Alar Products, Inc.
Aluminum Company of America
Aluminum Foundries, Inc.
American Die Casting Institute, Inc.
American Powdered Metals, Inc.
Amplex Division, Chrysler Corp.
Arwood Precision Casting Corp.
AMPCO Metal, Inc.
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Bound Brook Oil-Less Bearing Co.
Burgess-Norton Mfg. Co.
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Subsidiary of the JELRUS Co., Inc.
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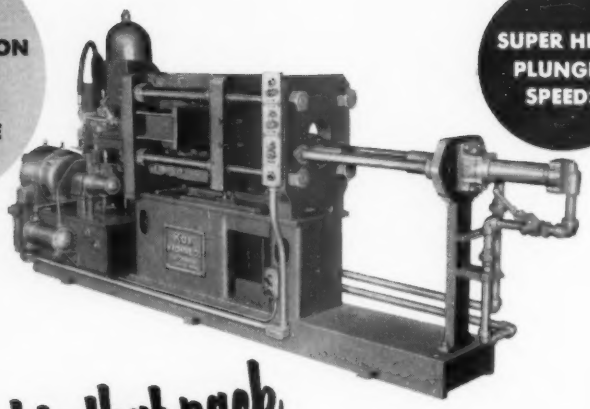

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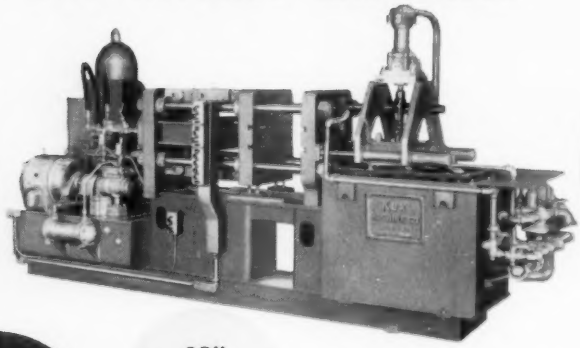

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Watch small design details on investment castings. A little attention can cut costs.

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Design Tips

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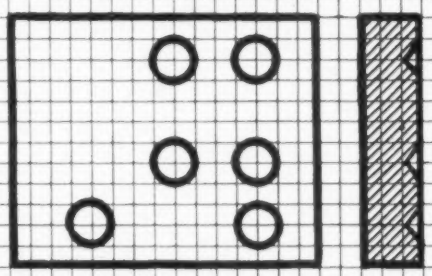
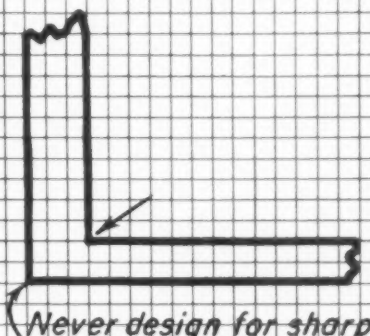
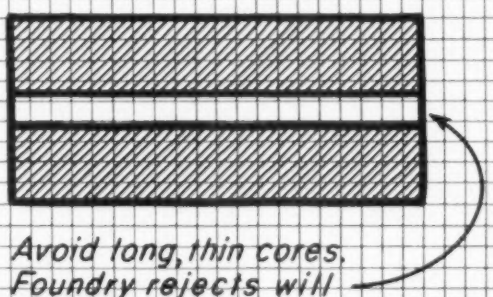


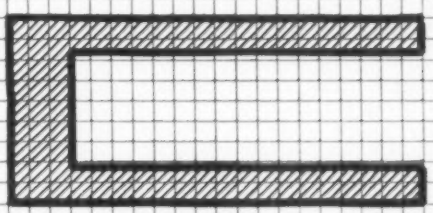
Where holes must be drilled, spot mark them on the casting to avoid jig drilling.



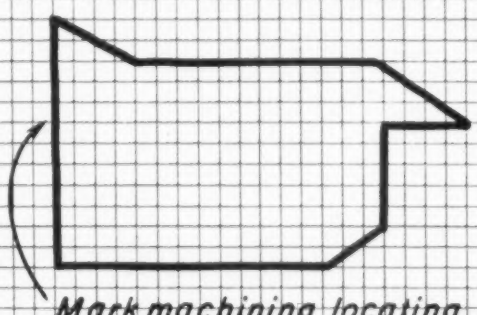
Never design for sharp corners, allow as generous a radius as possible.



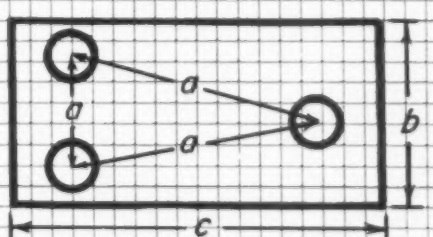
Avoid long, thin cores. Foundry rejects will be high.



Do not design for long unsupported cores. They may break during metal pouring.



Mark machining locating surface so that foundry will not gate casting on it.



Hold close tolerances only when necessary to keep costs down.

a — ±0.002
b & c — ±1/32

If only "a", distance is critical.

DATA OFFERED IN THIS MONTH'S ADS

the Reader Service Cards on the facing page will get you these free reference materials. Circle the numbers and mail.

1. **Mold & Die Coatings**—Bulletin No. 425, offered by Acheson Colloids Company, gives complete data on "dag" colloidal dispersions for cleaner parting, smoother-surfaced castings.

3. **Furnaces**—Detailed technical information is available on the 60 cycle induction melting furnaces of the Ajax Engineering Corp. Ranging in size from 20 kw to 2000 kw, the furnaces will produce from 150 pounds per hour up to 40 tons per hour.

4. **Die Steel**—A four-page bulletin on Ottawa 60 high-carbon, high-vanadium steel is available from Allegheny Ludlum Steel Corporation. Gives information on physical characteristics, complete data on forging, annealing, hardening, tempering, etc.

Hydraulic Filters—Catalogs contain complete engineering data and dimensional charts to facilitate ordering of a filter to meet specific requirements. Write to: Marvel Engineering Company, 7227 N. Hamlin Ave., Chicago 45, Illinois.

5. **Dies & Related Tooling**—Complete facilities list and detailed information is available on dies, hydrotels, pantographs, rotary head mills and jig mills produced by Alliance Special Products Division, Inc.

13. **Die Casting Machines**—IMP/96 mk II averages 600-1,000 shots per hour in production of hardware quality small parts of up to 1 lb. DCMT Sales Corp., Div. of British Industries Corp., offers complete data on this and other machines.

14. **Vacuum-Melted Alloys** — Cannon-Muskegon Corporation offers a bulletin about Ultramet Alloys. Available in a wide variety of cast or wrought forms.

16. **Automated Die Casting**—A brochure from Cast-Master Inc., describes a multiple cavity loader-unloader that loads laminations, die casts, trims and unloads 4 rotors automatically.

18. **800 Ton**—die casting machine produces castings up to 20 lbs. aluminum, 46 lbs. zinc. Complete specifications and technical data are available from Cleveland Automatic Machine Co.

21. **Universal Testers**—Units operate in tensile, compression, transverse or shear to make accurate checks on metal, plastics, wire, rubber, springs, etc. Handle round, flat or special shapes. Brochures and price schedule are offered. W. C. Dillon & Co., Inc.

25. **Metal Working Lubricants**—Fiske Brothers Refining Co. offers bulletins describing their 514A Hot Die Lubricant and other specialty lubricants.

27. **Degasser**—for aluminum alloys is described in literature offered by Foundry Services, Inc. Plunged into the melt, the "Foseco Degasser 400" is said to completely eliminate gas.

28. **Small Parts Problem**—A solution might be found in informative bulletins issued by Gries Reproducer Corp. The subjects are zinc alloy die castings, injection molded plastics, and low-cost fasteners.

29. **Metal Powders Data**—A complete reference manual on metal powder raw materials is available from Charles Hardy, Inc.

30. **Alloy Chart**—A helpful alloy wall chart is available from Henning Bros. & Smith. Complete data and properties are included for all alloys.

33. **Die Casting Machines**—Advantages of H-P-M equipment for producing quality castings at high production rates are covered in Bulletin 5700. Hydraulic Press Mfg. Company.

35. **Die Casting Machines**—Two new hydraulically operated die casting machines are described in a catalog issued by Kux Machine Co.

37. **Die Casting Machines**—have certified clamping tonnage, and one-piece cast alloy frame to retain the tonnage for the life of the equipment. Full specifications are available from Lester-Phoenix, Inc.

39. **Aluminum Die Castings**—Litemetal Dicast, Inc. offers literature and design information on the production of castings from the size of a button to large cable spools.

43. **Metal Powders**—Technical data is available on Grade A-213 and Grade B-280 Plast-Iron powders. Plastic Metals Div., National-U.S. Radiator Corp.

45. **Brass Powder Metallurgy**—"Facts about Pressed Brass and other nonferrous Powder Parts" is the title of a booklet for evaluating this production method in terms of particular needs. Published by The New Jersey Zinc Company.

46. **High Vacuum Furnaces**—are described in literature available from Kinney Mfg. Division, The New York Air Brake Company. Covers equipment for melting, alloying, casting, degassing, sintering, annealing, brazing and welding.

47. **Plaster Mold Castings**—A brochure from Ohio Precision Castings, Inc. contains interesting information on economical production of small parts.

49. **Metal Powders Report**—Improved "CDF Powders" and new "MS Powder" are explained in literature from Republic Steel Corp. Includes data on physical properties, applications, and tooling, designing and fabricating benefits.

51. **Stainless Steel Ladles & Skimmers**—Which are 75% lighter than cast iron and have extremely long life are described in literature offered by Spincraft, Inc.

61. **Trimming Presses**—Bulletin 142 gives complete data on Hannifin Corporation's line of high-speed hydraulic trimming presses.

62. **Chemical Coatings**—for removing rust, metal conditioning, phosphatizing and preparing metal for paint are explained in General Brochure 57-147. Neilson Chemical Co.

64. **Metal-Cleaning Handbook**—entitled "Some good things to know about Metal Cleaning" is offered by Oakite Products, Inc. Contains comprehensive information on solving a variety of metal-cleaning problems with speed and economy.

66. **Trim Fasteners**—Hex-head T.C.F. fastener pulls up tight without backup on flat or contoured surfaces, cuts clean, deep threads on unthreaded studs. Detailed drawings, dimensions and prices are available from United-Carr Fastener Corp.

70. **Investment Castings**—of magnetic alloys are being produced by Westinghouse Electric Corp. Complete details on facilities for supplying small quantities of prototype parts or production runs are available.

continued on page 65

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5	22	39	56	73	90	107	124	141	158	175	192	209	226	243	260	277	294
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8	25	42	59	76	93	110	127	144	161	178	195	212	229	246	263	280	297
9	26	43	60	77	94	111	128	145	162	179	196	213	230	247	264	281	298
10	27	44	61	78	95	112	129	146	163	180	197	214	231	248	265	282	299
11	28	45	62	79	96	113	130	147	164	181	198	215	232	249	266	283	300
12	29	46	63	80	97	114	131	148	165	182	199	216	233	250	267	284	301
13	30	47	64	81	98	115	132	149	166	183	200	217	234	251	268	285	302
14	31	48	65	82	99	116	133	150	167	184	201	218	235	252	269	286	303
15	32	49	66	83	100	117	134	151	168	185	202	219	236	253	270	287	304
16	33	50	67	84	101	118	135	152	169	186	203	220	237	254	271	288	305
17	34	51	68	85	102	119	136	153	170	187	204	221	238	255	272	289	306

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4	21	38	55	72	89	106	123	140	157	174	191	208	225	242	259	276	293
5	22	39	56	73	90	107	124	141	158	175	192	209	226	243	260	277	294
6	23	40	57	74	91	108	125	142	159	176	193	210	227	244	261	278	295
7	24	41	58	75	92	109	126	143	160	177	194	211	228	245	262	279	296
8	25	42	59	76	93	110	127	144	161	178	195	212	229	246	263	280	297
9	26	43	60	77	94	111	128	145	162	179	196	213	230	247	264	281	298
10	27	44	61	78	95	112	129	146	163	180	197	214	231	248	265	282	299
11	28	45	62	79	96	113	130	147	164	181	198	215	232	249	266	283	300
12	29	46	63	80	97	114	131	148	165	182	199	216	233	250	267	284	301
13	30	47	64	81	98	115	132	149	166	183	200	217	234	251	268	285	302
14	31	48	65	82	99	116	133	150	167	184	201	218	235	252	269	286	303
15	32	49	66	83	100	117	134	151	168	185	202	219	236	253	270	287	304
16	33	50	67	84	101	118	135	152	169	186	203	220	237	254	271	288	305
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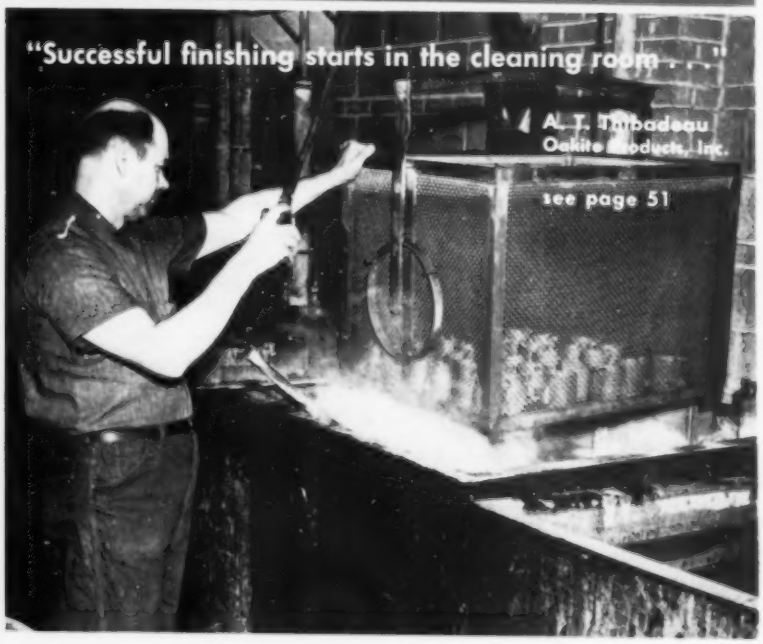
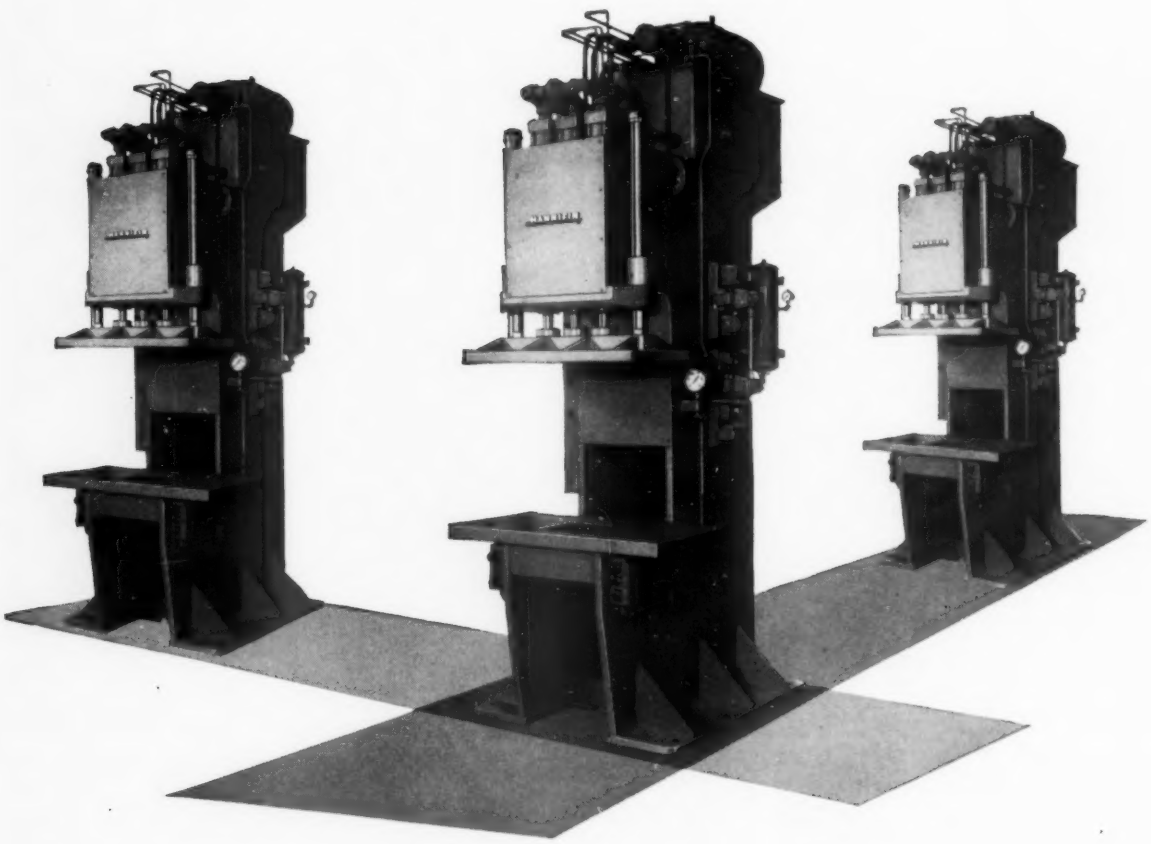
PMM Finishing Section

The specialized finishing methods, equipment and materials used to machine, assemble, surface condition or surface coat precision metal molded parts are presented here. This includes all secondary operations which convert a raw casting to a finished product.



see page 51

Why they trim more castings per hour with Hannifin hydraulics



Die casters who use Hannifin hydraulic Trimming Presses can quickly show you why their production rates are up.

The reason—Hannifin hydraulic Trimming Presses are different. They are specifically designed to take advantage of the desirable characteristics of hydraulic operation, yet fast enough to out-perform mechanical presses.

The really big advantage is the increased flexibility with Hannifin hydraulic power. You can have maximum rated power at any point in the stroke. That means shorter setup time, because it's so easy to adjust the press to trim at the exact point required by the die.

Hannifin presses give operators plenty of room for loading and unloading—with no sacrifice in speed and with the safety of dual controls. Operator fatigue is less because of the smoother, quieter action. Also, the smoother action of a Hannifin hydraulic press produces cleaner trims and reduces deburring and polishing time.

We believe it will pay you to investigate the advantages of Hannifin hydraulic Trimming Presses.

HYDRAULIC

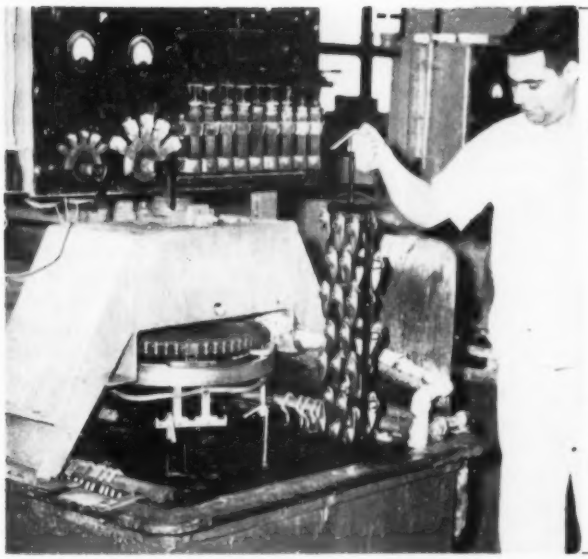
HANNIFIN

PRESSES

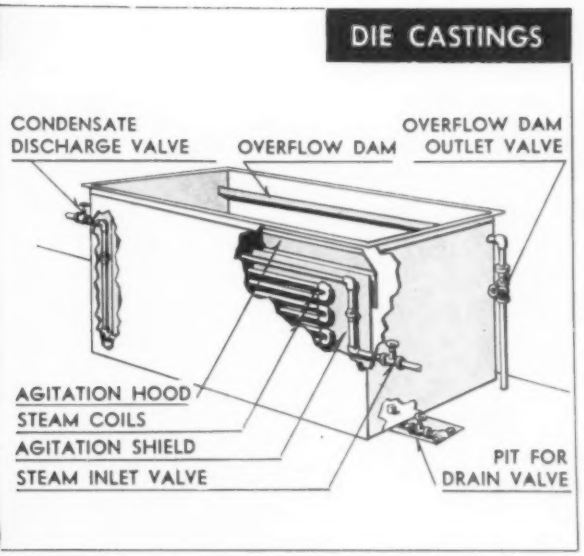
Write for your copy of Hannifin Bulletin 142—it tells why users are getting more pieces trimmed per hour with Hannifin high-speed hydraulic trimming presses. Hannifin Company, 581 South Wolf Road, Des Plaines, Illinois.

A DIVISION OF PARKER-HANNIFIN CORPORATION

For more information circle No. 61 on the Reader Service Card



SEMI-AUTOMATIC cleaning system processes parts before plating. A reverse current is used in Oakite Composition #191.



TYPICAL HOT-TANK details are shown in this drawing. The overflow dam allows skimming off contaminated soils.

Finishing Die Castings

Part IV: Cleaning

By A. T. THIBADEAU*

The final finish of any die casting, whether plated or painted, depends on the cleaning operation. No matter how high the quality of the intended finish might be, it can never be better than the cleaning which precedes it. Care in selecting cleaning method and material pays dividends in a more attractive, longer lasting finish.

There are three general methods of cleaning; mechanical, including grinding and sandblasting; temperature cleaning; and chemical cleaning. Sometimes the process involves more than one of these methods, as in barrel cleaning, where mechanical tumbling and chemical solutions both are used. Some mechanical action, in fact, is recommended for most cleaning operations.

Brushing, using wire or fiber brushes, is one of the most popular of the mechanical cleaning methods. It may be used in a variety of ways – dry or wet, with or without abrasives, by electrically driven belt or portable brushes. It removes scale, oxides, rust, burrs, and surface scratches, but it may change the dimensions of parts, and even cause new abrasions on the surface. While large parts may effectively be cleaned in this manner, the smaller the parts, the more impractical this method becomes.

Grinding is somewhat similar to brushing, except that the work is done by an abrasive wheel instead of brush. Like brushing, grinding is impractical for small parts cleaning because of the time involved. When used as a finishing method, as it often is, grinding is preceded by chemical cleaning to remove anything on the surface that might become imbedded in the part under the impact of the wheel, and is followed by chemical cleaning to remove abrasive and metal residues.

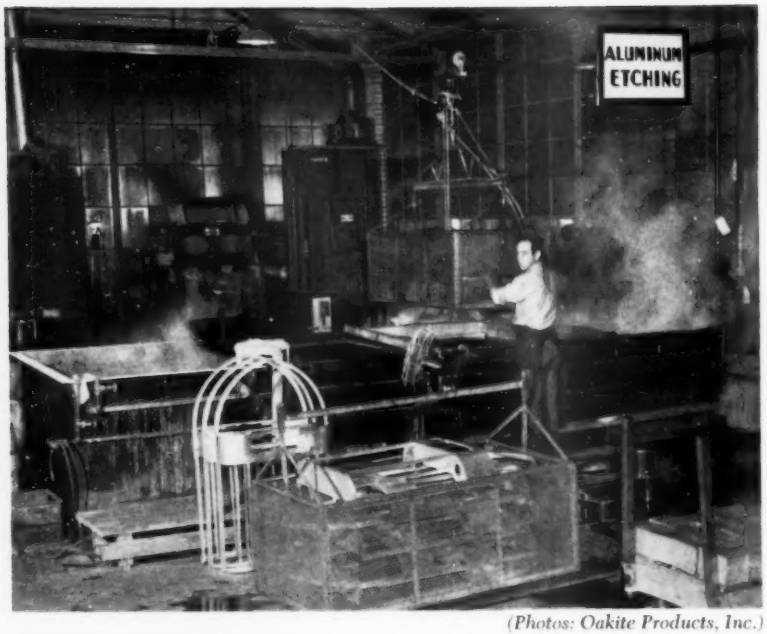
In blast cleaning, parts are subjected to bombardment by abrasives, such as sand, grit, and steel shot. The resulting texture will depend upon the kind of abrasive used, its shape and size; on the angle and distance of the air nozzle from the surface, and on the air pressure with which the abrasive is applied. Blasting is frequently used to remove imperfections from the surface and to roughen it for painting. Wet blasting has proved useful in promoting the adherence of chromium plates. While wet blast cleaning can be held to close tolerances, care must be used with dry blasting to prevent overstressing of metal and change in critical dimensions. Rust inhibitors are usually incorporated into the slurries used for wet blast cleaning, but surfaces are frequently given a rust preventive bath after blasting to prevent the formation of flash rust.

Vapor degreasing is one type of chemical cleaning. It consists of suspending the parts in the vapors of trichlorethylene or perchlorethylene which condense on the surfaces and wash off greasy and oily soils. Sometimes the vapor phase only is sufficient to remove the soils, sometimes others – involving boiling in the solvent or spraying with the solvent – are necessary to accomplish the work. Vapor degreasing is effective on certain soils, but it will not remove inorganic deposits and it is expensive. It is most frequently used as a precleaning operation.

continued on next page

*Oakite Products, Inc.

continued from preceding page



(Photos: Oakite Products, Inc.)

ETCHING ALUMINUM SURFACES is sometimes done before giving them a pre-paint treatment. De-oxidizing and conversion coating follow the etching.

Other chemical cleaning methods involve tank immersion, spray washing, hand application, or ultrasonic cleaning. Either solvent or water-based detergents may be used in each of these methods, and the main constituent of the solution may be alkaline salts, solvent detergents, or acids, depending upon the major constituent of the soil. Often, indeed, a series of tanks or spray applications is used to achieve the thorough cleaning and preparation of surfaces required for exacting modern finishes. Each solution is applied in order: solvent to remove the dried-on greasy soils; alkaline material to remove shop dirts and oils; acid solution to remove oxides and scales.

The most frequently used cleaning solutions are alkaline, combining such salts as sodium hydroxide, sodium metasilicate, orthosilicate, or trisilicate, trisodium phosphate, sodium carbonate, sodium tetraborate, tetrasodium pyrophosphate, or sodium polyphosphate, combined with water softeners and wetting agents. Some such materials contain soaps to solubilize fatty acid soils, but the wetting agents are generally used because they are more stable in the presence of acids and rinse better from the work. Alkaline solutions will remove light to heavy deposits composed of mineral or fatty oils, oil and water emulsions, mill oils, and the lighter antirust coatings. The growing use of chelating agents has made possible the removal of rust, oil, and old paint in the same alkaline solution. Not all alkaline cleaning solutions are recommended for use on all metals. While steel, copper, and magnesium may be cleaned safely with heavy duty alkaline cleaners, aluminum and zinc may be attacked by such treatment, and inhibited cleaners should be used. If it is desired to etch aluminum before painting, for instance – specially designed etching compounds may be recommended. Care should also be taken to prevent tarnishing on brass when cleaners with high soap or silicon content are used. Another precaution: cleaning solution and contaminated rinse water should not be allowed to dry down on brass, zinc, and aluminum surfaces. The use of an additive such as Oakite Rinsite in the final rinse will prevent water spotting on the finished part.

Acidic detergent solutions are used to remove oxides, scales, tarnishes, and other corrosion. They are usually of the phosphoric acid type, and contain wetting and emulsifying agents and inhibitors to prevent attack on sound surfaces. Their chief use on die castings is as conditioners for painting.

Several types of solvent materials are used for cleaning – emulsifiable solvents, used in precleaning to remove heavy dried on grease deposits or buffing compounds; solvent emulsion or di-phase solvent cleaners for spray washing applications.

The cleaning operation selected will depend to a great extent on the metal and the soil to be removed from it, and on the subsequent finishing operation as well.

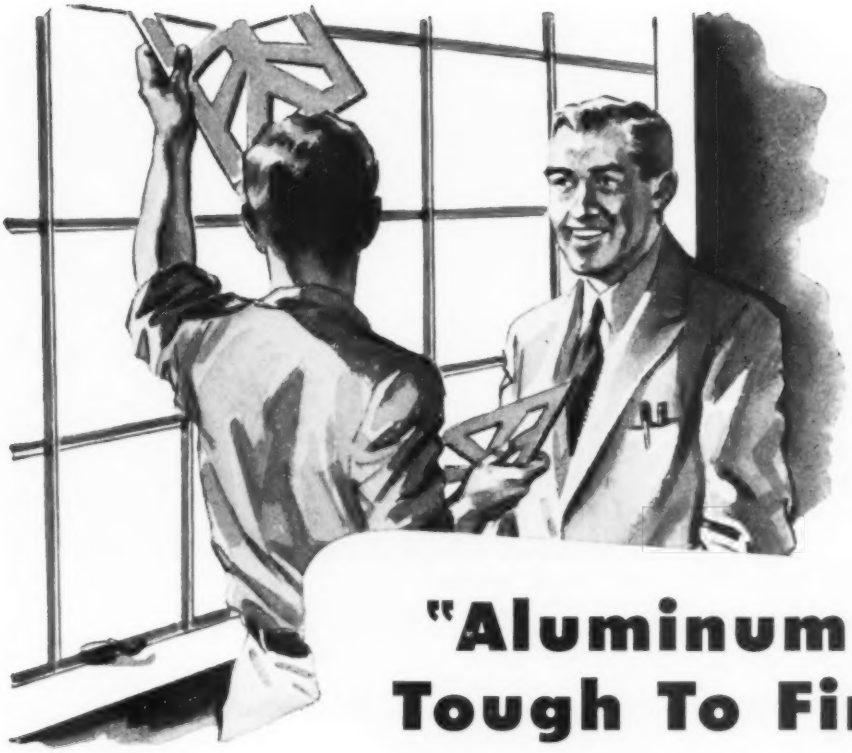
When die cast parts are to receive no further treatment after cleaning but are assembled immediately, cleaning is relatively uncomplicated. Detergent and method will vary according to whether the metal is ferrous or non-ferrous, whether temporary rust protection is desired, whether etching is desired on aluminum, etc. Vapor cleaning, alkaline soaking, or alkaline or solvent spray machine washing may be sufficient. Spray washing is generally the most efficient, particularly when large volumes of parts are processed.

The majority of die castings are plated or painted, and cleaning, particularly before plating, becomes quite critical.

Electrocleaning is the one precise method for die castings designed for electroplating. After parts have been precleaned by vapor degreasing, solvent soak, or ultrasonic cleaning to remove the buffing compound and other tenacious deposits, they go into the electrocleaning bath. Precleaning is always recommended because it permits the electrocleaning solution to do its work thoroughly and economically. Precleaning itself should be done immediately after parts are buffed or barrel burnished, before the soil has a chance to dry.

Ultrasonic cleaning is a very effective method of removing buffing compound from die castings before plating. Simply stated, it consists of agitating cleaning solutions through the great energy of sound waves. Tiny invisible bubbles of

continued on page 54



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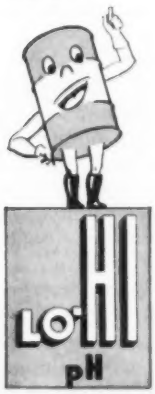

ALKALUME CLEANERS—A full line of cleaners and etching compounds especially formulated for use on aluminum alloys prior to plating, anodizing, painting or welding.

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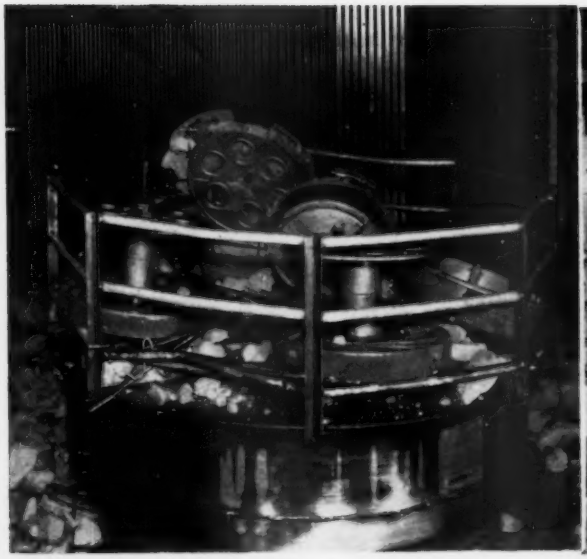
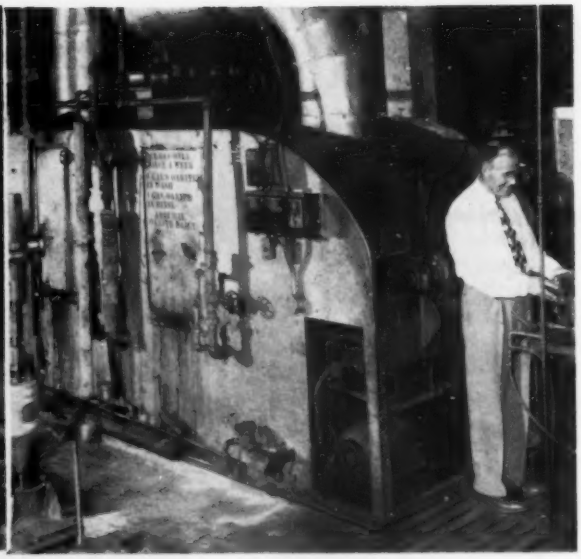


HYDRO-BLAST INTERIOR shows center table. It rotates while water-pressure knocks oxide, scales off castings.



SPRAY WASHING cleans large volume parts most easily. Specially picked detergents clean certain metals.

FINISHING

continued from page 52

cleaning solution expand and collapse against the surface to be cleaned, and this violent action and reaction rips the soil from the parts. This method is fast and thorough, removing soil from even the smallest cavities and crevices; it can clean assembled parts without their being taken apart; and, despite its vigor, it is completely safe. While it has not replaced electrocleaning, it is a first-rate precleaning method.

Electrocleaning uses electrical current to generate gas in the solution close to the metal surface, producing energetic scrubbing action. Reverse current, in which the part being cleaned is the anode, is preferred to direct current or cathodic cleaning for use on all metals except lead. Cathodic cleaning plates out smut on the work.

The cleaner chosen for electrocleaning should have the following characteristics:

1) Good detergent action, for fast emulsification; suspension, and removal of soils.

2) Inhibition, to prevent tarnishing of brass and copper alloys, and eliminate etching of zinc and aluminum.

3) High conductivity, to assure efficient use of the available current.

4) Rinsability, to prevent water breaks in succeeding operations.

5) Tolerance for chromic acid carried over on racks from the plating bath.

As mentioned previously, the metal involved has important bearing on the cleaner and specific electrocleaning process selected. Some examples, as typical of electrocleaning operations as the highly individual process of electroplating will permit, follow.

Zinc:

The following procedure is recommended for use on zinc die castings: Preclean. Clean with reverse current for 20 to 40 seconds in a solution of Oakite Composition No. 95, at 3½ to 4½ ounces per gallon of water at 155 to 170°F, 20 to 40 amperes per square foot, 6 volts. Cold running rinse. Acid dip 10 to 20 seconds in ¼% by volume sulphuric acid solution at room temperature. Cold running rinse. Plate.

Oakite Composition No. 95 has proved itself in many plating shops. It removes the films and under surface shadows that impair the brightness of plated surfaces. There is no anodic blackening. It guards against peeling and blistering and hydrogen gas absorption, which might cause blisters when castings are heated after electroplating.

Copper & Alloys:

The electrocleaning procedure recommended for copper and its alloys involves soak – anodic cleaning in a 4 to 8 ounce per gallon solution of Oakite Composition No. 191. Parts are first soaked in this solution for 2 to 5 minutes, then cleaned in reverse current for 5 to 30 seconds at 40 to 60 amperes per square foot, 5 to 6 volts. Temperature ranges from 180 to 200°F. One tank may be used for both soak and electrocleaning, except when deposits are heavy, when two tanks are recommended. Cold running rinse follows, then dip in sulphuric or hydrochloric acid solution. Another cold running rinse and electroplating follow. To protect the bright buffed finish, and to prevent etching the surface, careful control of concentration, temperature, current density and time must be exercised.

Lead and Its Alloys:

Lead and its alloys react rather quickly to alkaline solutions, and reverse current cleaning will attack the surface. It is recommended that heavily soiled parts be precleaned, then electrocleaned in a solution of Oakite Composition No. 66 at 4 to 6 ounces per gallon, at 160 to 180°F, 15 to 30 seconds, using direct current at 20 to 30 amperes per square foot, 4 to 6 volts. This is followed by a cold running rinse, and a few seconds dip in fluoboric acid. Another cold running rinse is followed by electroplating.

Lead salts have a tendency to build up in electrocleaning solu-

continued on page 64

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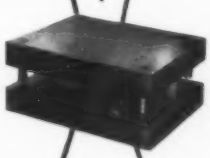

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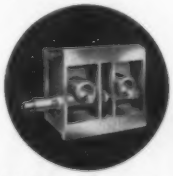

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Here are five types of widely used . . .

Fasteners For Non-Ferrous Castings

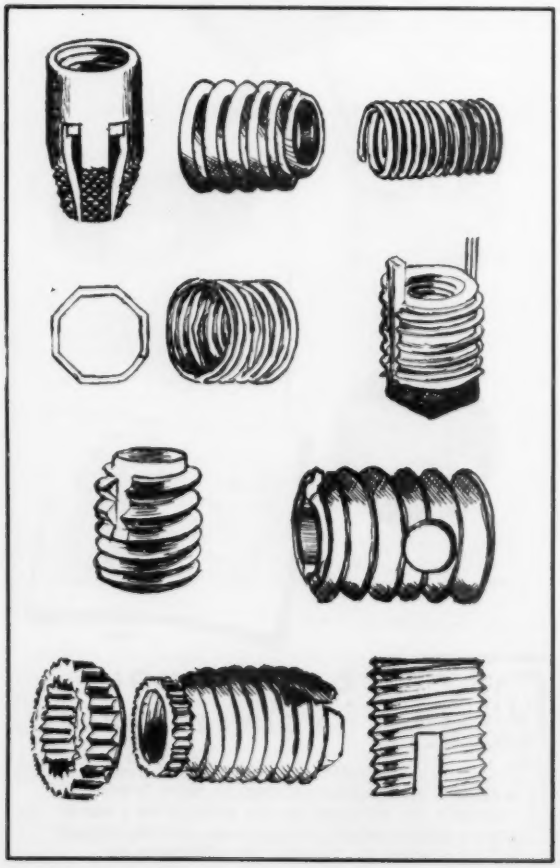
ONE of the outstanding features of parts made by the PMM processes is their adaptability to the use of high speed fasteners. In fact, many of the fastening devices in use today were developed for use with die and permanent mold castings in zinc and aluminum. Most of these devices have gone on to wider applications, but are still in common use as originally conceived.

No attempt will be made to suggest uses for the different types of fasteners. Rather the broad subject will be reviewed and the various kinds of fasteners illustrated. Emphasis must be placed on the selection of fastening methods and general types of fasteners at the design stage.

If, in a die casting for example, either a self threading screw or a threaded insert may be used, the choice must be made in design since the size, depth and possibly location of cored holes may be quite different. If a boss must be provided, the size and possibly its location will be influenced by the type of fastener to be employed.

Before discussing the individual types of high speed fasteners, mention should be made of two good books on fasteners. The Fasteners Handbook, by Julius Soled, published by Reinhold Publishing Corp. and the Handbook of Fastening and Joining of Metal Parts, by Vallory H. Laughner and Augustus D. Daragan, published by McGraw-Hill Book Co.

INSERTS



INSERTS for non-ferrous castings fall into three broad classes. Those to be cast in place, those to be pressed into cored holes and threaded inserts. Of the three the most commonly used is probably the threaded insert in one of its many designs. Some of these are for insertion into a previously tapped hole, while others cut their own threads when put in.

Where a threaded insert is to be used as a cast-in unit the outer surface is generally knurled, grooved or given some other treatment to insure good anchoring. Generally these inserts will withstand torsional and tensile stresses up to the shear strength of the cast metal. They have the advantage of low cost and permanence, but the disadvantage of slowing down the casting cycle while inserts are placed in the die.

Pressed in inserts are easily and quickly applied. They will withstand considerably torsional stress (up to the shear strength of the metal) but are not as satisfactory in tension as some other types. Generally these threaded inserts are used where light hold-down applications are involved, but where assembly and disassembly is frequent enough to require steel.

By far the most common type of threaded insert in use is the type having both external and internal threads. These are available as both self threading and for insertion into a tapped hole.

All of these externally threaded inserts have some type of locking device to prevent either stripping the threads in the soft metal or loosening due to repeated assembly and disassembly.

Companies who make inserts of the types illustrated are: *The Phelps Mfg. Co., Elastic Stop Nut Corp. of America, Heli-Coil Corp., Newton Insert Co., Fasteners, Inc., The Nylok Corp., Rosan, Inc., Groov-Pin Corp.*

TAPPING SCREWS

WHEN the assembly of non-ferrous parts requires the use of machine screws but where repeated tightening and loosening will not occur, it is common practice to use self threading or tapping screws.

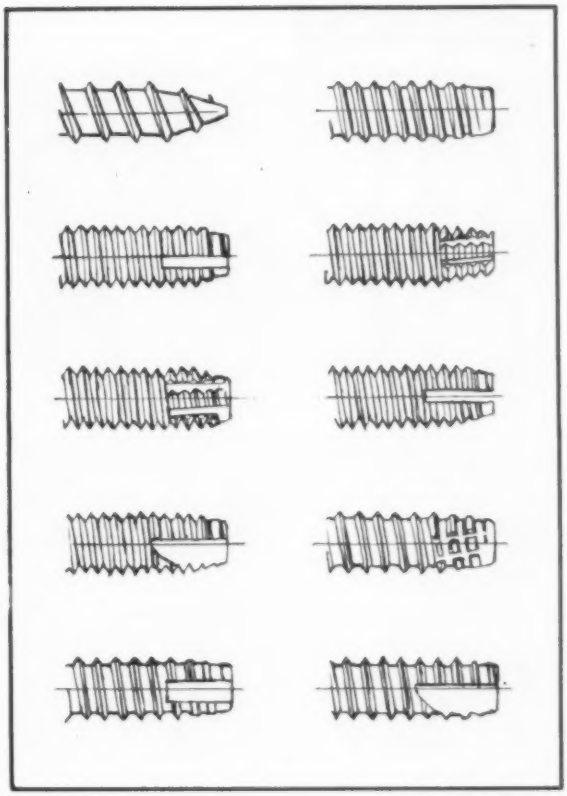
These screws come in a wide variety of styles, types and sizes, but can be roughly divided into thread cutting and thread forming or rolling types. The difference is in the method of forming the thread in the casting. A thread cutting screw, as its name implies, removes metal in much the same way that a tap removes metal to cut a thread. A thread rolling or forming screw depends on plastic deformation of the metal to allow the formation of a thread without removing any metal.

All of these screws have some sort of "built-in" locking device. This may be simply a taper on the screw, an offset thread or two or some other means that insures a tight, permanent fastening.

On thread cutting screws it is common to have the tip fluted to permit faster cutting and good ship clearance.

All of these screws give a tight permanent fastening and permit occasional disassembly and reassembly without loosening. The maximum stress that can be exerted is the shear strength of the metal into which they are set.

Tapping screws are made by many of the screw manufacturers. Those illustrated are typical of the line made by *Parker-Kalon Div., General American Transportation Co.*



NUTS

FOR use on either smooth or threaded studs there are two general types of nuts. One is the standard threaded nut into which some type of locking device has been built so that a separate lock washer is not required. This locking device may be a soft compression collar with a slightly smaller diameter than the major diameter of the bolt. In this case a thread is impressed, not cut, into the locking collar. Compression of the collar against the stud accomplishes the locking action.

Another type of lock nut has several sheared sections near the top of the nut. These sections compress the top threads so that when the nut is applied compression of the upper section holds the nut in place.

Among the spring action nuts nearly all depend on distortion of fairly thin gauge spring steel, within its elastic limit. These nuts can be used to replace a standard unit and may be applied and removed repeatedly as long as the top remains domed so that full spring action is retained.

Pushnuts are designed for use on either a threaded or unthreaded stud. They depend, in the case of a threaded stud, on the spring action working against the thread and on unthreaded studs on the spring steel digging into the stud. On unthreaded studs or rods these nuts may be difficult to remove and replace.

Manufacturers of the various types of nuts are: *Elastic Stop Nut Corp of America, Snakeproof Div., Illinois Tool Works, The Palnut Co., Prestole Corp., Tinnerman Products, Inc.*

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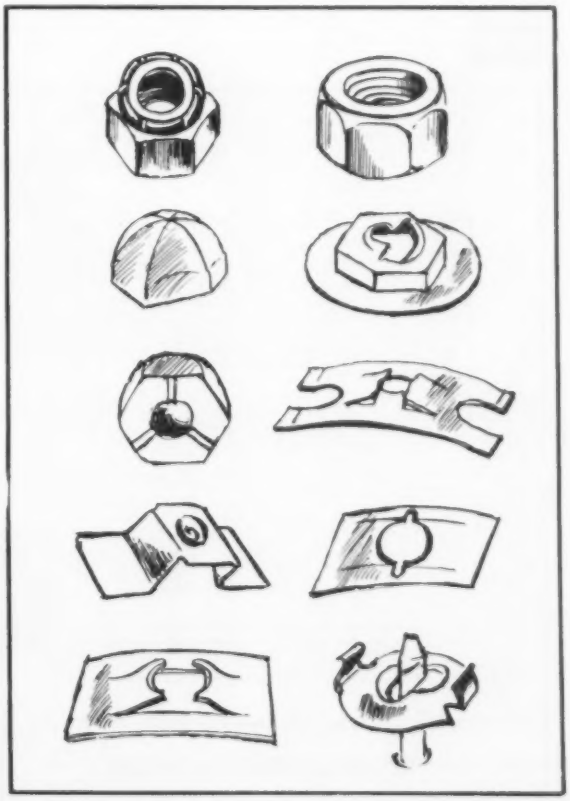
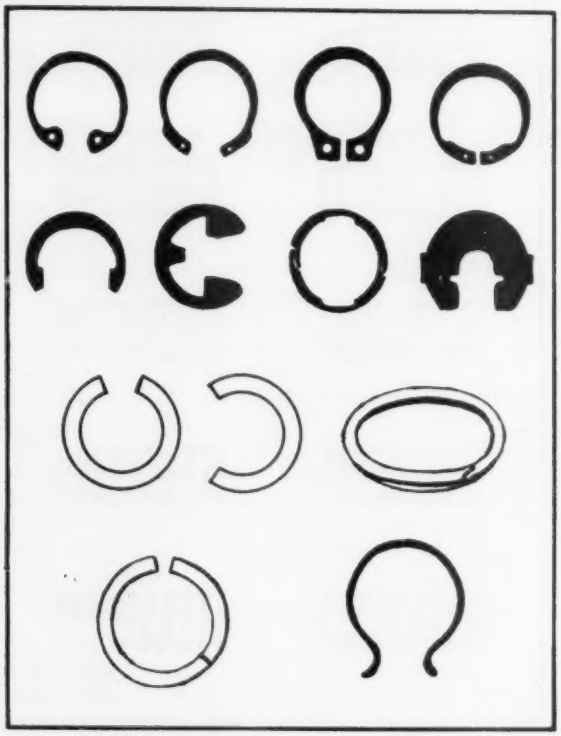


RETAINING RINGS



FASTENERS

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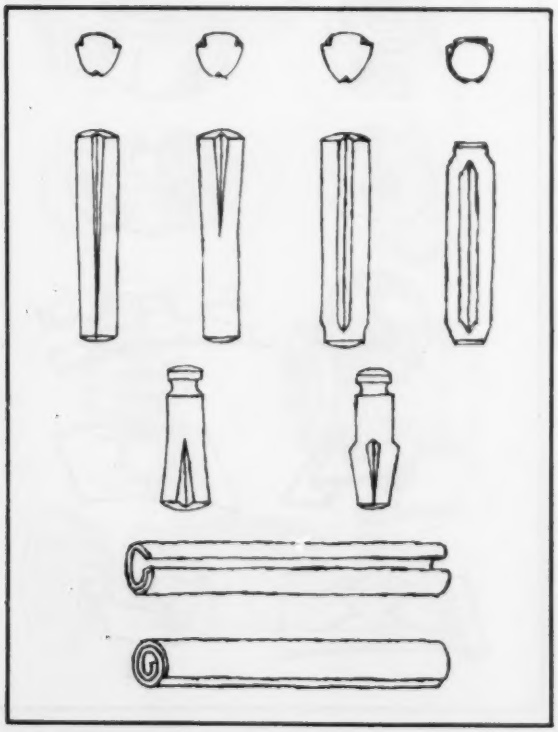
RETAINING rings are used in two general applications. One of these is the formed wire clip that fits into a machined groove on a shaft or pin. In this same class are the spring rings that also fit into an annular groove, but do not project as far beyond the shaft as the spring clips. This type of ring or clip can be applied and removed at will and some require only ordinary tools for handling. Others are best applied or removed by using special tools designed for the particular ring being used.

These tools, are made to assist in the efficient use of these rings.

The other general type of retaining rings do not require an annular groove in the shaft or stud and are widely used for positioning such things as bearings or other machine parts. These rings depend on the gripping action of the spring steel to hold their position. In many cases they avoid the machining of a collar on a shaft. Both square and round sections are available. Retaining rings are available for both internal and external use and are designed to withstand predetermined thrust loads when used as collars. Some manufacturers can supply snap rings in a wide variety of wire section shapes and sizes for special applications.

Manufacturers of snap rings include: *Connor Spring Mfg. Co., The National Lock Washer Co., Reliance Div., Eaton Mfg. Co., Ramsey Corp., Waldes Kohinoor, Inc.*

PINS



PINS of various types are widely used in the assembly of die and permanent mold castings. They are of particular value when the pin hole in the casting can be cored. Where cored holes are shallow they will be free of draft and almost any type of pin can be used. On deep holes, however, some taper is required to permit withdrawal of the core rod. In these applications it is common to use one of the locking type that depend on spring action to hold in place.

One widely used type of pin depends on both the plastic and elastic flow of metal. Grooves are rolled into the surface of the pin displacing some metal. When the pin is forced into place this displaced metal flows elastically into the grooves. Large radial forces are thus developed to hold the pin in place.

Thus this type of pin remains firmly in place after it is applied.

Another type of pin is slotted and depends for its holding action on compression of the pin. This type of pin is made slightly larger than the hole diameter and spring action holds it firmly in place.

Spirally wound spring steel pins are also in wide use. These pins are wound of flexible spring steel and are especially adapted for use with soft metals since they will conform to holes without precision drilling. They are available in a variety of tensions.

Manufacturers of the different pins are: *Groov-Pin Corp., Elastic Stop Nut Corp. of America, C.E.M. Co.*

Single Operator Can Boost Production 30%

DIE CASTINGS

ONE operator on the machine in figure 1, at the Kalamazoo Die Casting Co., in Kalamazoo, Michigan, can machine 30% more die-cast phonograph pickup arms in an hour than three people before.

Die castings are deburred at three stations: First, when a slot at the bottom of a cored hole is broached; Second, after another cored-slot is end-milled; Third, when the irregular outside contour is wire-brushed. The casting is then automatically ejected into a chute.

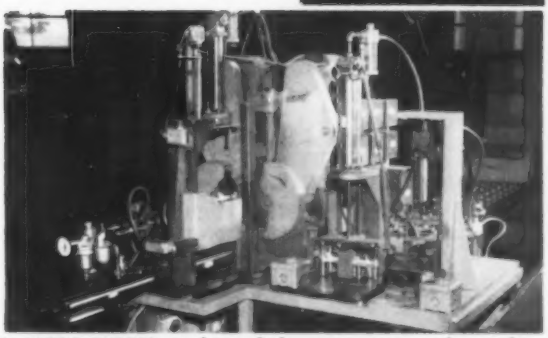
The die-cast arms are loaded into these three stations and the operator presses two "Start" buttons. Castings then move progressively through all three.

Five Bellows air motors, two of them equipped with hydro-checks for precision hydraulic control of the feeding rate, and an air-operated vise, are the principal air-powered units which provide work and control the movements of the machine.

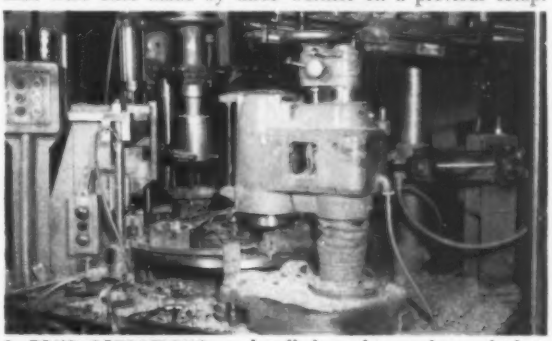
Another machine, designed and shop-built by the Die Cast Finishing Co. of Cleveland, Ohio, figure 2, handles four machining operations.

Bellows' equipment here include: a 26" rotary feed table; two drill press feeds; and two air motors. All are basic components of the machine.

Low voltage air control valves safe-guard both the operator and his equipment.



1. MORE PIECES can be made by one operator on this machine than were once made by three workers on a previous setup.



2. FOUR OPERATIONS are handled on this machine which is wired to permit either automatic or individual-station operation.

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Model '5000

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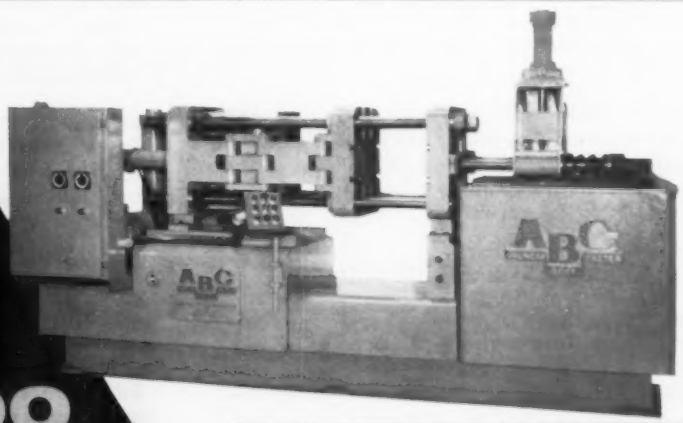

ABC machines from 16 Ton Air Operated—to 750 Ton Hydraulic Zinc and Aluminum.

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- 150 TON HYDRAULIC
- 2½" TIE BARS
- 15" X 15" BETWEEN TIE BARS
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USEFUL LITERATURE, CATALOGS, MANUALS

any of these technical publications may be obtained by circling the appropriate numbers on the Reader Service Cards, Pages 56-57

PMM PROCESSES

Zinc & Aluminum Die Castings: 154
Advance Tool and Die Casting Company—A 6-page brochure is offered which describes the company's die casting facilities and production capabilities. Handy condensed tables show physical composition and average properties of zinc and aluminum alloys to help in materials selection.

Aluminum Castings: 155
Eastern Casting Corp. Div., The Eastern Malleable Iron Co.—Facilities for producing aluminum permanent mold castings and aluminum die castings are illustrated and explained in a brochure. A table of tolerance capabilities for each process is included.

Investment Castings: 156
Illinois Precise Casting Co.—A booklet is offered which explains the process and shows the company's production facilities. Includes photos of investment cast parts and gives cost savings over previous production method.

Die Casting Plant: 157
The New England Die Casting Co.—A booklet presents the equipment and methods used to manufacture quality castings at the largest die casting plant in the New England states.

Precision Die Castings: 158
Caldwell Casting Co.—A brochure outlines Caldwell's die casting facilities; includes photos of the company's modern equipment and castings produced.

MATERIALS & EQUIPMENT

Beryllium Properties: 159
The Beryllium Corporation—A paper which was presented at the Atomic Energy Management Conference is offered in booklet form. "Beryllium Present and Potential Uses" covers properties, applications, cost and availability of beryllium metal and beryllium oxide.

Lock Nuts & Fasteners: 160
The Palnut Company—28-page catalog includes product descriptions, illustrations, dimensions, screw tension pounds, materials, finishes, typical applications. Gives details of design and locking principle, high-speed wrenches and applicators, assembly and cost data.

Powder Metal Presses: 161
Press Division, F. J. Stokes Corporation—New dual-pressure hydraulic compacting presses for powder metallurgy, operating at maximum pressures from 57 tons up to 545 tons, are described in data sheet 121. The units feature proportional pressing, through complete control of press motions, to give uniform high density in the production of multi-level parts.

Melting Furnaces: 162
Ajax Engineering Corporation—Pamphlet R 44 describes small Ajax-Tama-Wyatt 60 cycle induction furnaces for melting and holding nonferrous metals. Also available is a list of reprints of articles and other literature describing a complete line of induction furnaces for melting ferrous and nonferrous metals.

Aluminum Mill Products: 163
Kaiser Aluminum & Chemical Sales, Inc.—An informative 24-page brochure offers engineering data on aluminum characteristics, fabricating and finishing techniques, and mechanical and physical properties of alloys. Availability of a complete line of mill products is listed, and the company's services are explained.

Pyrometers: 164
The Pyrometer Instrument Co.—Descriptive and technical data is offered on PYRO Optical, Micro-Optical, Radiation, Immersion, Surface and Indicating Pyrometers. Catalog 125 explains the principles of operation of the units, and gives complete specifications and prices.

Production Tempering Furnaces: 165
Ipsen Industries, Inc.—Technical bulletin DL-58 explains the equipment's "straight-through" feature, and automatic loading equipment for in-line operation; cross-section drawings show other features. A specification table gives overall length, width and height; hearth dimensions; work tray size; number of work trays furnace can hold; approximate shipping weight.

Powder Data: 166
Easton Metal Powder Company, Div. of American Mannex Corp.—A 6-page bulletin compiles specification data of RZ Iron Powder for powder metallurgy, electronics, flame cutting, scarfing and washing, flux coating of welding electrodes and chemical applications.

Materials Handling: 167
May-Fran Engineering, Inc.—Catalog MF-100 is designed to aid management in selecting hinged steel belt conveyors for moving all types of materials for the metal working industries. Special emphasis is given to standardized prefabricated sections which can be easily assembled, lengthened, shortened or dismantled to meet changing requirements.

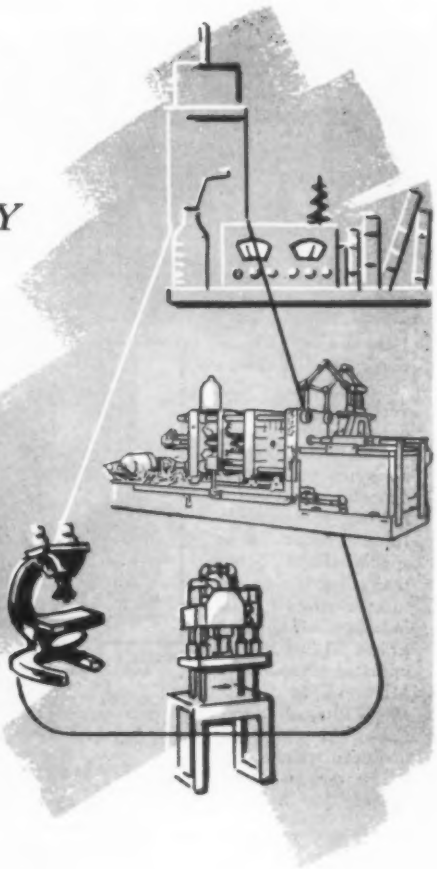
continued on page 63

B&T MACHINERY COMPANY

announces the establishment

of a new

RESEARCH CENTER



for the use of DIE CASTERS

. . . well equipped, individually located, and entirely non-commercial, this center is dedicated to the advancement of automation, the use of vacuum attachments, control of temperatures, lubricants, variable shot control and other phases of the die casting art.

All Die Casters are cordially invited to use these facilities as a possible perfection of their die casting technique.

B&T MACHINERY COMPANY manufactures a complete line of Die Casting Machines, both cold chamber and gooseneck types, in capacities of: 100, 200, 300, 400, 500, 600, 750 and 800 tons. Also Hydraulic Presses.

PRECISION BUSS MACHINERY

B & T MACHINERY COMPANY

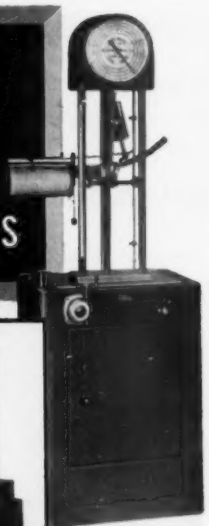
201-217 WEST EIGHTH ST., HOLLAND, MICHIGAN • PHONE EXport 2-2341

SUBSIDIARY OF BUSS MACHINE WORKS — MANUFACTURERS OF MACHINERY SINCE 1862
REPRESENTED IN CANADA BY UPTON BRADEEN & JAMES, LTD.

For more information circle No. 12 on the Reader Service Card

For more information circle No. 21 on the Reader Service Card

THE ULTIMATE
in testing perfection
Dillon
UNIVERSAL TESTERS



Here's a low cost tester that operates in tensile, compression, transverse or shear. This inexpensive instrument can make *hundreds* of accurate checks daily on metal, plastics, wire, rubber, springs, etc. Handles round, flat or special shapes. More than 15 gripping fixtures available. Max. indicator. Self-aligning grips. Hand wheel operated or motorized. Meet ASTM & Fed. specs. Rugged & fast. Calibrated with certified dead weights. Recorder optional. Max. capacity 300 lbs.

MODEL L. Heavier unit for materials up to 125,000 lbs. PSI. 7 interchangeable gauges provide wide range.

MODEL M. For low strength materials between 0 & 300 lbs. Pendulum-type with 5 scales.

Write For brochures and LOW price schedule today!

W.C. *Dillon* & CO., INC.
14598AB Keswick St.
Van Nuys 41, California
(suburb of Los Angeles)

THE "RUSTY" Months are Here Again!

- **and you CAN'T paint over RUSTY METAL!**
- **Use METALPREP RUST REMOVER— to throughly rid metal of RUST and assure greater paint durability!**

Metalprep is a proven, superior product backed by twenty-five years of metal conditioning experience. WRITE OUR CUSTOMER SERVICE DEPARTMENT FOR RECOMMENDATIONS FOR ELIMINATING YOUR RUST PROBLEMS.

• • •

Also other products for Metal Conditioning, Phosphatizing and Preparing Metal for Paint

LYFANITE A	PHOSTEEM	PREPNCOTE	LYFANITE Z
Corrosion Resistant, Paint Bonding, Conversion Coatings for Aluminum	Cleaning and Iron Phosphating Process Using Steam Guns	Cleaning and Phosphating Process for Use in Spray Washers	Zinc Phosphate Coatings for Paint Bonding, Flat Polishing, and Cold Forming

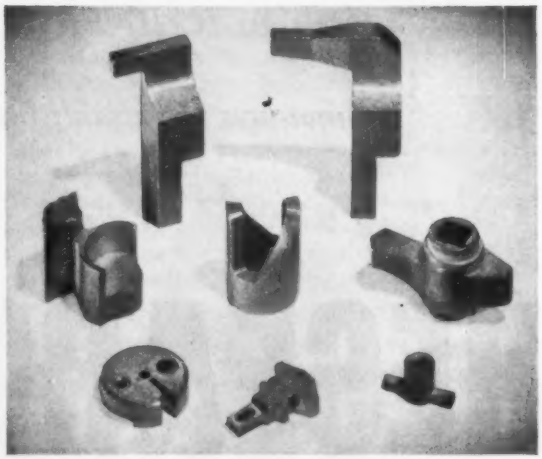
***and in addition:* GALVAPREP, EMULSOPREP, ALUMIPREP**
Send for General Brochure 57-147

NEILSON CHEMICAL CO.

Southeastern Distributor: F. H. ROSS CO. Charlotte, North Carolina
2330 Gainsboro, Detroit 20 (Ferndale), Michigan
Allentown, Penna. Los Angeles, Cal. Windsor, Ontario

For more information circle No. 62 on the Reader Service Card

MULTI-PART PERFORMANCE
AT ONE-PART COST...



...an outstanding advantage of
BRASS POWDER METALLURGY

These complicated shapes are made as one-piece metal powder sinterings. They are manufactured to very close tolerances and designed to function with a high degree of precision.

Each one of these metal powder parts is made at substantially lower unit costs than would have been possible by ordinary machining or as a multi-piece assembly.

By designing for brass powder metallurgy, there are other advantages:

. . . ***elimination of secondary machining***
. . . ***high durability of parts in use***
. . . ***mass production with uniformly high quality***
. . . ***controlled mechanical properties***
. . . ***parts promptly available.***

It will pay you to consult a powder metal fabricator for his advice on how to incorporate these advantages in your products.

THIS BOOKLET
will assist you in evaluating this modern production method in terms of your particular needs.

SEND FOR YOUR COPY

THE NEW JERSEY ZINC COMPANY
160 Front Street, New York 38, N. Y.

For more information circle No. 45 on the Reader Service Card

USEFUL LITERATURE

continued from page 60

Belt Finishing Machines: 168
Hammond Machinery Builders, Inc.—Bulletin 751 shows abrasive belt flat finishing machines, both single and multi-head, for flat work which is difficult and slow to hand-finish. Optional heads accommodate belts 6 in., 8 in., 10 in., and 12 in. wide.

Brush Catalog: 169
S. A. Felton & Son Company—A 64 page catalog lists maintenance and industrial brushes for both hand and machine use. Descriptions, illustrations and ordering specifications for every class of brush are given, with useful information on brush materials, brush constructions and how to select the right brush for each job.

Ultrasonic Cleaners: 170
General Ultrasonics Company—Detailed information is available on a line of ultrasonic processing equipment utilizing a new patented transducer element which is claimed to be virtually indestructible. High efficiency of the transducer provides high intensity ultrasonic energy at low initial and operating expense.

Cutting Tools: 171
Severance Tool Industries Inc.—Catalog No. 23 has 40 pages covering a complete line of high speed and carbide tools for milling, deburring, drilling, chamfering, etc. Information on a money-saving regrinding service is included.

DESIGNED & BUILT BY:

ALLIANCE SPECIAL PRODUCTS DIVISION INC.
MANUFACTURERS OF
DIES & RELATED TOOLING FOR
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- 15 Full Time Design Engineers
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3 Dimensional Duplicators to 30" x 60"

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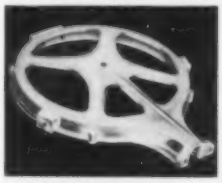
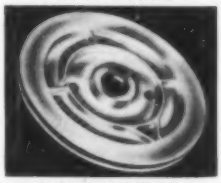
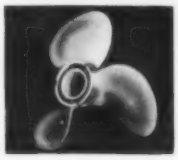
ALUMINUM DIE CASTINGS
for
OUTBOARD MOTORS


OUTBOARD MOTOR STARTER HOUSING


OUTBOARD MOTOR STARTER PULLEY

DRIVESHAFT HOUSING

EXHAUST and PROPELLER GEAR HOUSING—below ALUMINUM PROPELLER



—Important Factors In Their Increasing Popularity

Literally, 101 applications are found for the use of aluminum die castings—ranging from the starter on top, down to the propeller — on today's dependable lightweight outboard motors. Unquestionably the use of aluminum die castings has played a major role in making practical the increasing use and enjoyment of outboard motors by millions of Americans. Their advantages are many: great savings in weight, corrosion resistance and minimum of machining required for finishing.

Note in the photographs above, the inclusion of mounting bosses in the castings which reduces assembling costs. The starter pulley, by LITEMETAL, shown above, includes the addition of brass inserts to afford greater wear resistance. Why not consult our designers . . . whatever your field of manufacture.

Let's Talk It Over . . .

LITEMETAL DICAST, INC. is an organization of specialists — men thoroughly experienced in the casting and machining of magnesium and aluminum alloys. Our equipment includes big machines for big jobs — little machines for little jobs . . . the right sizes and types of the most modern die casting equipment for producing parts from the size of a button to large cable spools. Complete facilities for secondary operations are also available.

Write today for literature and design information. Quick action on inquiries.

LITEMETAL DICAST, Inc.
A SUBSIDIARY OF HAYES INDUSTRIES
1925 WILDWOOD AVE. · JACKSON, MICHIGAN
PLANT AND EXECUTIVE OFFICES

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now

you can get this brilliant finish directly on zinc die castings!

PART AS CAST

No electroplating--no mechanical finishing!

TREATED WITH NEW IRIDITE

NEW IRIDITE® (Cast-Zinc-Brite)

brightens zinc die castings by chemical polishing, protects against corrosion

NOW, FOR THE FIRST TIME you can get a brilliant, decorative finish directly on zinc die-cast parts . . . without mechanical finishing, without electroplating! The luster is provided by the *chemical polishing* action of new Iridite (Cast-Zinc-Brite) solution. Even surface blemishes, such as cold shuts, are brightened by this new process. No electrolysis. No special equipment. No specially trained personnel. Just a simple chemical dip for a few seconds and the job is done. And, this new Iridite has been *tested and proved* in production.

CORROSION RESISTANCE, TOO! New Iridite (Cast-Zinc-Brite) provides exceptional corrosion resistance for bright-type chromate finishes . . . also guards against blueing or darkening by eliminating zinc plate formerly required in bright chromate finishing of zinc die castings.

AS A BASE FOR ELECTROPLATING—Lower mechanical finishing costs are possible where plated finishes are *required* since the brightness provided by this new Iridite may be sufficient.

LET US SHOW YOU what Iridite (Cast-Zinc-Brite) can do for you. Send us at least a half-dozen typical zinc die-cast parts for FREE PROCESSING for your own tests and evaluation. Or, for immediate information, call in your Iridite Field Engineer. He's listed under "Plating Supplies" in your classified 'phone book. *IMPORTANT: when you give us samples for test processing, please be sure to identify the alloy used.*

Allied Research Products, Inc.

4004-06 EAST MONUMENT STREET
BALTIMORE 5, MARYLAND

Manufacturers of IRIDITE®, IRILAC™, ARP® Brighteners and Plating Chemicals—West Coast Licensee: L. H. Butcher Co.

For more information circle No. 59 on the Reader Service Card

FINISHING

continued from page 54

tions, so they should be changed frequently. Otherwise, the salts will plate out as a smut on the parts and interfere with electroplating. Aluminum:

When aluminum is to be plated, its natural oxides must be removed and the aluminum given a "zincating" dip. Aluminum is cleaned in an alkaline solution, deoxidized in an acid dip, then dipped into the zinc solution and finally electroplated. Magnesium not only needs this "zincating" treatment, but additional pickling and activation of the surface in an acid bath.

Cleaning before painting is not as critical an operation as cleaning before plating. It has often been sufficient to produce a dull, rough finish which gives paint a better grip on the metal. Where longer lasting coatings are required by the nature of the service to which the parts will be subjected, or by government specifications, phosphate and chromate conversion coatings are being used with considerable success. These coatings, which become integral with the surface of the metal, improve the chemical as well as the physical bond between metal and paint, giving both longer life and better resistance to corrosion. Should the painted surface be damaged, these coatings help prevent the spread of the resulting corrosion under the sound metal surface.

Typical of the many proprietary compounds developed for this purpose is Oakite ChromiCoat. The procedure commonly used for its application by tank immersion is the following:

1) Parts are cleaned in an alkaline solution, inhibited to prevent attack on the aluminum or zinc. If etching is desired, specially designed, controllable etchants are used for this.

2) Cold running rinse.

3) Deoxidize in acidic Oakite Compound No. 34.

4) Cold running rinse.

5) Immerse in Oakite ChromiCoat for 3 minutes at room temperature.

6) Cold running rinse and air dry.

The ChromiCoat treatment is also effective when applied in pressure spray washing machines.

DATA IN ADS *continued*

2. Refrax Pots—Information is available on the company's line of refrax pots, ingot molds, utility castings and goosenecks. ACF Industries Inc.

20. Die Components—170 page catalog offered by Detroit Mold Engineering Co. lists complete data and prices on cavity retainer sets, ejector boxes and ejector housings.

32. Air & Gas Dryer—New "Certain Curtain Molecu-Dryer" gives high temperature drying to dew points of minus 100°F or better, utilizing recently developed molecular sieves. Complete data is available from C. I. Hayes, Inc.

60. Zinc Die Casting Machine—Hydraulically operated Model #5000 has 150 tons locking pressure and 15" x 15" clearance between tie bars, provides high speed production of quality castings. A.B.C. Die Casting Machine Co. offers detailed information.

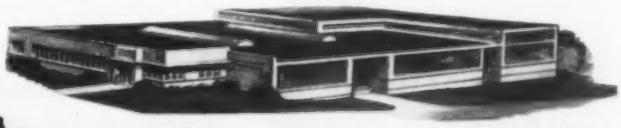
For more information circle No. 41 on the Reader Service Card

is yours when you specify

DIE CASTINGS by MILWAUKEE

Yes, the folks at Milwaukee have learned a lot in these many years of continuous service to industry in the design and production of die cast components for all kinds of products. When you come to Milwaukee for your die castings, their experience is yours at no extra cost. Backed by the facilities of its modern plant, Milwaukee offers you Complete Die Casting Service to help you realize more fully than ever, *all* of the benefits of the die casting process.

Milwaukee operates under the Certified Zinc Plan of the American Die Casting Institute.



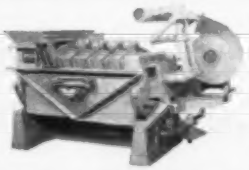
MILWAUKEE DIE CASTING COMPANY
4146 N. HOLTON STREET • MILWAUKEE 12, WISCONSIN
Established 1909

For Finer, Faster Castings

STROMAN FURNACES

Melting Brass, Bronze, Aluminum, Magnesium or any other non-ferrous metal? Are you Sand Casting, Die Casting, Billet Casting, Permanent Molding, Extruding or Forging? If so, Stroman is your natural source for melting furnaces . . . for Stroman builds only the finest, fastest melting, most economical, longest lasting and of course the most modern furnaces to melt any metal.

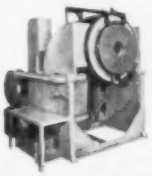
Illustrated are just a few of the various models available. A letter will bring Bulletin No. 150 which illustrates the complete line . . . or better yet let a Stroman Metallurgist consult with you on their application in your plant.



STROMAN "JC" TILTING TYPE FURNACES FOR MELTING BRASS. Fastest Melting . . . from 15 minutes up . . . lowest fuel consumption . . . always perfect metal for castings . . . capacities from 400 pounds to largest requirements.

STROMAN REVERBERATORIES for the melting of Unlimited Capacities of Aluminum, Zinc or Brass. Excellent for Smelters or Billet Casters.

STROMAN "RF" BARREL TYPE POWER TILT FURNACE for Brass, Aluminum, Iron and various smelting operations. Sizes range up to 20,000 pounds brass.



STROMAN STATIONARY LIP POUR CRUCIBLE MELTING FURNACES . . . MECHANICALLY OR HYDRAULICALLY TILTED. For brass, bronze, aluminum and other non-ferrous metals. Made in sizes from No. 60 to No. 1000 crucible.

STROMAN IRON POT AND CRUCIBLE STATIONARY DIP-OUT FURNACES FOR MELTING AND HOLDING. For Aluminum, Lead, Zinc and other white metal alloys. Rugged construction with ample combustion room to prevent direct impingement of flame on pot. Available with or without hoods.

STROMAN MANUAL TILT CRUCIBLE MELTING FURNACE. The old standby for melting Brass, Bronze, Aluminum and other alloys with capacities from No. 30 to No. 600 crucible. Real lasting construction and new gear box makes tilting so easy.

STROMAN FURNACE & ENGINEERING COMPANY
9900 FRANKLIN AVENUE, FRANKLIN PARK, ILLINOIS

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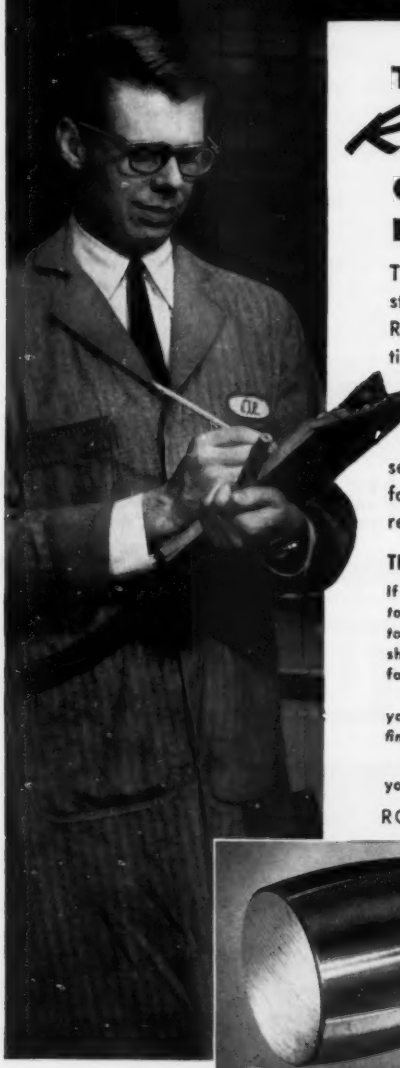
HIS JOB

....TO BUILD
YOUR PROFITS!



THE
Roto-Finish
CUSTOMER'S
MAN

There's nothing unique about stressing product quality. But, at Roto-Finish we have an added incentive. The success of the Roto-Finish Customer's Man *depends* on providing the kind of dependable, mass-production finishing service which builds customer satisfaction, and results in a steady repeat business.

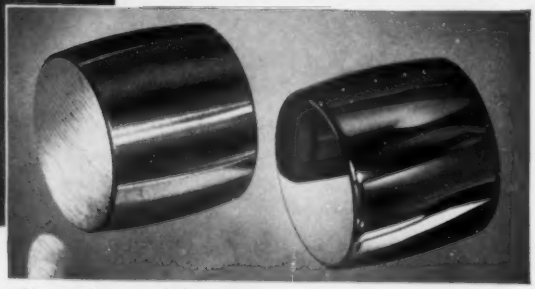
TRIAL AND ERROR FINISHING IS COSTLY

If you're now barrel finishing, our Customer's Man will welcome an opportunity to work with you in your own plant to show you how to get the finish you want, faster, and at lower cost.

If you're hand finishing, he can show you how to save up to 80% of your present finishing costs.

WANT PROOF? Then write or phone your Roto-Finish Customer's Man today.

ROTO-FINISH CASE HISTORY



*This photo is unretouched.
**MATERIAL: Bearing steel, 61 Rockwell C Scale.
DIMENSIONS: 1.213" dia. x 1.015".
FINISH BEFORE: Ground to 10 RMS.
FINISH AFTER PROCESSING: 2 to 4 RMS,
(with no dimensional change).

Roto-Finish COMPANY
3716 Milham Road
KALAMAZOO, MICHIGAN
Phone: Fireside 3-5578

ROTO FINISH

FOREIGN REPRESENTATIVES: ARGENTINA—Taller—Buenos Aires ● AUSTRALIA—A. Flavell Ltd.—Cheltenham ● BRAZIL—Commercial E. Industrial de Fornos Werco, Ltd.—Rio de Janeiro ● CANADA—Canadian Henson & Van Winkle Co., Ltd.—Toronto ● ENGLAND—Roto-Finish Ltd.—Hemel Hempstead ● FRANCE—Societe Roto-Finish—Paris ● GERMANY, AUSTRIA, NORWAY, SWEDEN, SWITZERLAND—Metallgesellschaft A. G.—Frankfurt, a. M.—Germany ● HOLLAND, BELGIUM, LUXEMBURG—N. V. Roto Finish Maatschappij—Delft, Holland ● ITALY—Societa Roto-Finish a R. L.—Milan ● SPAIN—Instituto Electroquimico, S. A.—Barcelona

For more information circle No. 65 on the Reader Service Card

BONSACK JOINS ALMAG

Walter Bonsack

J. G. G. Frost, President of Aluminum and Magnesium Inc., announced today that Walter Bonsack has become affiliated with the Company. Mr. Bonsack will be Chief Metallurgist of Aluminum and Magnesium Inc. and will have his headquarters at the Central Office located at Sandusky, Ohio.

Since coming to America in 1927, Bonsack has made many scientific and technical contributions to the fast growing aluminum industry. He established the first metallurgical laboratory in the secondary aluminum smelting industry in the United States and developed many new aluminum alloys as well as improving many others. He has also done considerable work with fluxes and fluxing methods for aluminum alloys, both for cleaning and for refining. During his work with fluxes, he originated the boron flux. Many of the cleaning and refining fluxes developed by him are used throughout the smelting industry.

VANADIUM-ALLOYS NAMES NEW POWDER METALLURGIST

Dr. George A. Roberts, Vice President — Technology of the Vanadium-Alloys Steel Company announced the appointment of Robert C. Hessinger as a metallurgical engineer in the Powder Metallurgy Department at Latrobe.

Hessinger will work directly under Powder Department Manager William L. Batten servicing customer applications of prealloyed metal powders. The new powder metallurgist is a graduate of Carnegie Institute of Technology. Hessinger, a member of the ASM has had previous experience in metallurgical quality control.

NEWS OF INDUSTRY & ASSOCIATIONS

activities of people, companies & groups in the precision metal molding industries

DON O. NOEL NAMED PRESIDENT OF M.D.

Don O. Noel

The election of Don O. Noel as President has been announced by Metals Disintegrating Company, Inc., subsidiary of American-Marietta Company. Metals Disintegrating is the world's largest manufacturer of finely divided metals with plants at Elizabeth and Summit, New Jersey; Manchester, New Hampshire; and Berkeley and Emeryville, California.

Mr. Noel is well-known in the metal powders field, having been associated with it for more than 25 years. He was originally with Metals Disintegrating from 1929 to 1948 and his activities included research, production, sales and engineering. Prior to his rejoining Metals Disintegrating as Assistant to the President in 1956, he was associated with the Wah Chang Smelting and Refining Company and the General Metals Powder Company.

The appointment of Mr. D. C. Bradley as a Vice President has also been announced. Mr. Bradley joined the Metals Disintegrating organization in 1954. He will continue to function as General Manager of the Company's Pulverizing Machinery Division of Summit, New Jersey, which position he has held since December, 1955.

Mr. Bradley has had extensive experience in the metal field, having previously held executive posts with the American Brake Shoe Company and the New Jersey Zinc Company.

NEW RESEARCH LAB. FOR DIE-CASTING INDUSTRY

The B&T Machinery Company of Holland, Mich., manufacturers of a complete line of die casting machines for the zinc and aluminum die casting trade, announces the recent opening of a research laboratory for the investigation and testing of new developments for the die casting industry. In this laboratory, which is housed in a separate building containing 6,000 square feet of floor space and equipped with complete vacuum apparatus for the vaccum casting of both zinc and aluminum, many things, it is said, are going on for the benefit of the industry. Through development processes with prominent die casters, B&T Machinery Company is doing additional research work on efficient and economical methods of producing zinc and aluminum vacuum die castings in ranges from 25 inches to 28 inches of Mercury with simple units that can be attached to most all makes of die casting machines. Studies are being carried out on an automatic zinc die casting machine. Coupled with this program will be development work on die temperature control units, automatic spray lubrication, automatic casting ejection, preladling and automatic ladling of aluminum. Included in the lab's equipment will be the new B&T air-hydraulic trim press. Requests for further details concerning information to be had and use of the laboratory, say B&T officials, are invited.

ANDREW F. KRAVIC JOINS INCO SALES STAFF

Andrew F. Kravic has joined the Non-Ferrous Section of the Nickel Sales Department of The International Nickel Company, Inc., it was announced by A. P. Gagnebin, Assistant Vice-President and Manager of the Department. Mr Kravic will devote his attention to the field of powder metallurgy, specializing in the sales and promotion of carbonyl nickel and carbonyl iron powder.

CURRY APPOINTED SALES MANAGER OF DOLLIN CORP.

Gordon C. Curry

Gordon C. Curry has been appointed General Sales Manager of Dollin Corporation, Irvington, N. J., manufacturers of zinc and aluminum die-castings.

Mr. Curry is well-known in die-casting circles, having been identified with the design, purchase and sale of die-castings since 1921. His former connections include 26 years with The Hoover Company, in the custom die-casting division which he helped to inaugurate, and 11 years with Precision Casting Company, Inc., where he spent 8 years as Eastern Sales Manager and General Sales Manager.

Mr. Curry has been very active in technical and educational association activities within the die-casting industry for many years. As a member of the Board of Directors of the American Die-Casting Institute, he helped organize the Eastern Group of the Institute, promoting and participating in the regional shows and clinics run by that group. He was the first Chairman of the Institute Publicity Committee and is currently chairman of the Educational Committee.

Mr. Curry pioneered the idea of setting up Product Standards at the Institute, to foster a uniform understanding of dimensions, tolerances, alloys, porosity, flatness and other die-casting practices among manufacturers and customers. He is also a member of the American Ordnance Association.

HOW TO GET *MORE* FOR YOUR CASTING DOLLAR

Accurate analysis of your casting costs should include a thorough knowledge of the scope of your suppliers' operations. Monarch's new brochure gives you an informative guide to our modern manufacturing methods.

- Growth of casting usage
- Plant facilities and services
- Aluminum permanent mold castings
- Aluminum and certified zinc diecastings
- Automated permanent mold trimming
- Mechanized diecast trimming
- Secondary machining operations
- Custom finishing
- Exclusive Monarch finishes
- Casting engineering analysis
- Production control

Send for your copy today.

MANUFACTURING in MOLTEN ALUMINUM ACHIEVEMENTS

MONARCH ALUMINUM MFG. COMPANY

9205 Detroit Avenue Cleveland 2, Ohio

Circle No 42 on the Reader Service Card

HARPER APPOINTED H-VW-M CHIEF MECH. ENGINEER

Willard J. Harper joins Hanson-Van Winkle-Munning Co. as Chief Mechanical Engineer, the company announced here today.

Mr. Harper will head all mechanical design engineering, which has been integrated into a newly created group at H-VW-M. His appointment follows closely the announcement of major reorganization of the firm's entire engineering division. A company spokesman emphasized that the move reflected an intention to engage in major engineering programs for the development of radically new additions to its equipment and product lines.

To implement the increased emphasis on research and development, the company is building new mechanical and electrical facilities and expanding facilities of its electrochemical laboratory.

COOK NAMED MARKET DEVELOPMENT ENGINEER

Albert R. Cook

The appointment of Albert R. Cook as Market Development Engineer for the American Zinc Institute, Inc. has just been announced by John L. Kimberly, executive vice president of the Institute.

Mr. Cook was formerly Sales Development Engineer for Northern Aluminum Company, Ltd., one of the largest manufacturers of semi-fabricated aluminum parts in the United Kingdom. Northern Aluminum is located in Banbury, Oxfordshire, England.

A graduate of Downing College, Cambridge, Mr. Cook brings to his post broad experience in the application of metals throughout England.

Thousands of extra pours per ladle, with less effort for the operator
the Spincraft STAINLESS STEEL ladle
for non-ferrous metal pouring

LIGHT
TOUGH
LONGER-LASTING

If you pour non-ferrous alloys, Spincraft ladles will save you replacement costs and make the job much easier. Designed to reduce operator fatigue by their lightness, balance, and non-spill shape, they resist burning-through as only stainless steel with its high critical melting point can do. Spincraft ladles come in 23 sizes, from ¼ lb. to 30 lb. molten metal capacity.

- 75% lighter than cast iron ladles
- Amazingly long life
- Shot-blasted for coating adhesion
- Deep conical form makes pouring easier, minimizes spillage
- Can be used for zinc and other metals without coating
- "Whack proof" handle arc-welded to reinforced cup edge
- Built to last longer, work lighter. Let your operator use one, then try to take it away from him!

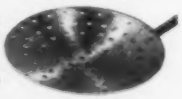
Complete handle on ¼ lb. through 9 lb. size; 10 through 30 lb. size has handle bracket stub to which proper length handle can be attached.

Also...Spincraft STAINLESS STEEL Skimmer

A skimmer that really skims! Shallow radius skims surface impurities instead of ladling as deeper-cupped skimmers do. Correct size holes prevent clogging. Short handle stubs fit common pipe and permit attachment of length and type handle you want.

IN FOUR DIAMETERS: 6 inch, 8 inch, 10 inch, 12 inch.

Spincraft ladles and skimmers are also available in low-cost mild steel.



Spincraft STILL WILL DO IT INCORPORATED

Write for complete data and prices today.

SPINCRAFT, INC.
4138-E West State St., Milwaukee, Wis.

Send us complete information on:

Stainless Steel	Mild Steel
☐ Ladles	☐ Ladles
☐ Skimmers	☐ Skimmers

Company .....

Address .....

City ..... State .....

Name .....

Circle No. 51 on the Reader Service Card

NOW standard hand socket wrench or nut-runner drives THREAD CUTTING FASTENER

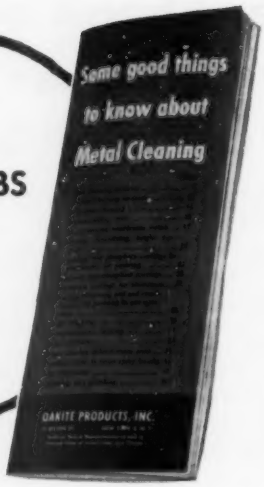
Specifically designed to hold die-cast or cold-forged name plates, emblems and trim against sheet metal surfaces . . . DOT's hex-head T.C.F. can be used in many other applications which require a spring take-up fastener (with integral washer) that pulls up tight without backup on flat or contoured surfaces.

It cuts clean, deep threads on unthreaded studs, even those that are chrome plated. Used on non-vertical studs, T.C.F. accomodates itself to any angle up to 20° from the vertical . . . and, when supplied with a pre-assembled plastic sealer, makes a water-tight seal. The sealer *precedes* the fastener onto the stud so that it is not damaged by the thread-cutting process.

T.C.F. is available *in quantity*, with or without sealer, to fit 1/8", 3/16" and 1/4" studs. Detailed drawings, dimensions and prices available on request.

For more information circle No. 66 on the Reader Service Card

WHICH METAL-CLEANING JOBS WOULD YOU LIKE TO IMPROVE?



¶ Are you cleaning metal in the most economical way? *See page 9 of Oakite's FREE booklet on Metal Cleaning.*

¶ Are you cleaning metal the fastest way? *See page 12.*

¶ Do you need room-temperature cleaning combined in one operation with temporary rustproofing? *See pages 12 and 14.*

¶ Do you know the advantages of alkaline pickling? *See page 21.*

¶ Have you compared the values of iron phosphate coating and zinc phosphate coating in preparation for painting? *See pages 22 and 25.*

¶ Can you use a cleaner that removes rust and oil at the same time; often eliminating all need for pickling? *See page 30.*

¶ Do you have trouble stripping epoxy resins, pigment residues, phosphate coatings and under-paint rust? *See page 31.*

¶ How do you clean parts that are too large to be soaked in tanks or sprayed in machines? *See page 31.*

¶ Are you getting full profit out of your finishing barrels? *See page 32.*

¶ What do you do when oversprayed paint neither floats nor sinks in your paint spray booth wash water? *See page 35.*

¶ Do you need better protection against rusting in process or in storage? *See page 37.*

FREE For your copy of "*Some good things to know about Metal Cleaning*" write to Oakite Products, Inc., 34G Rector Street, New York 6, N. Y.

SPECIALIZED INDUSTRIAL CLEANING
OAKITE
MATERIALS · METHODS · SERVICE
SCIENCE

Technical Service Representatives in Principal Cities of U.S. and Canada
Export Division Cable Address: Oakite

For more information circle No. 64 on the Reader Service Card

LORCH NEW MARKETING MANAGER FOR KAISER

A. V. Lorch

A. V. Lorch has been named marketing manager, pig and ingot, for Kaiser Aluminum & Chemical Sales, Inc., Oakland, it was announced by Stanley B. White, vice president and general manager of the Metals Division. Appointed to succeed Mr. Lorch in Chicago as pig and ingot product manager is W. J. Lawler.

Mr. Lorch joined Kaiser Aluminum in 1951 after having been associated with the Bendix Aviation Corporation and the White Metal Rolling & Stamping Corporation. He is a graduate of Cooper Union in New York City with a degree in chemical engineering.

HANKINS NAMED PRESIDENT OF BUNTING BRASS

William M. Hankins, Jr., widely-known industrialist in the southern and midwestern sections of the country, has been named president of The Bunting Brass and Bronze Company, world leader in the design and manufacture of bronze alloy parts and bearings.

Mr. Hankins assumed office February 1, succeeding George H. Adams who will retire after 30 years of service with the 50-year-old Bunting Company and a career in the business and industrial field dating back to 1910. Mr. Adams had been president of the firm since 1945.

Anticipating a sustained encouraging demand for the future, the company directors disclosed the completion of a $1,000,000 expansion program in 1957 covering a new plant for a wholly-owned subsidiary, Detroit Sintered Metals Corporation of Kalamazoo, Michigan, and an enlarged machine shop and other improvements in Toledo.

MEYER ELECTED VICE PRES. C. B. HUNT & SON, INC.

Kenneth H. Meyer

C. B. Hunt & Son, Inc., of Salem, Ohio, manufacturers of Quick-As-Wink Air and Hydraulic Control Valves and Pressure Specialties, has announced the election of Kenneth H. Meyer as Vice President.

A native of Erie, Penna., Meyer worked briefly at Erie Forge and Steel Co., then joined the Air Force during World War II. He graduated from Case Institute of Technology in 1949 with a Bachelor of Science Degree in Mechanical Engineering; — was awarded a fellowship in the Aeronautical Engineering Department at Case; and received his Master of Science Degree in Mechanical Engineering from Case in 1950. For four years he was Senior Development and Project Engineer at Goodyear Aircraft Corporation. He joined C. B. Hunt & Son, Inc. in 1954 as Assistant Chief Engineer, and became Director of Engineering in 1957.

BOUND BROOK PLANS MODERN PLANT AT STURGIS, MICH.

Bound Brook Oil-Less Bearing Company of Bound Brook, New Jersey, will build an ultra-modern powder metallurgy fabricating plant at Sturgis, Michigan, Mr. S. S. Connor, company's Vice President, said.

"The million dollar plant will be geared to high volume production of sintered bearings and parts, and will use various fabricating methods developed by Bound Brook engineers. Construction, which will start immediately, will be completed later this year."

aluminum . . .
▶ permanent mold castings
▶ die castings

EASTERN CASTING CORP. DIVISION
THE EASTERN MALLEABLE IRON CO.
64 South William Street, Newburgh, New York
For more information circle No. 24 on the Reader Service Card

ATOLS
TOOL AND MOLD CORPORATION

DESIGNERS & FABRICATORS

of
QUALITY MOLDS
for the
DIE CASTING INDUSTRY

Complete designing and engineering. Modern plant & equipment includes BG-21 4' x 6' & BL-3620 Keller Duplicators.

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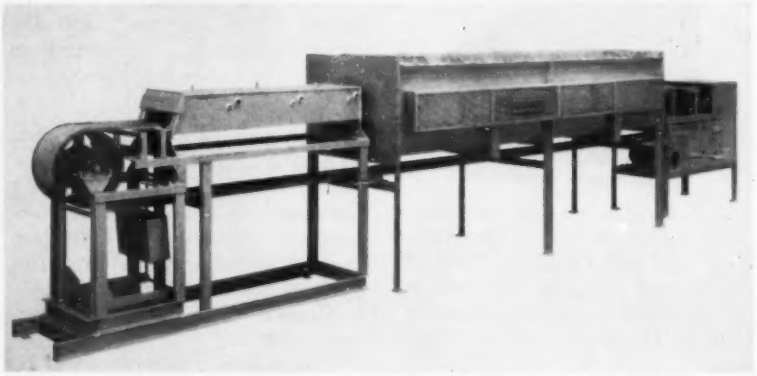
Circle No. 11 on the Reader Service Card

NEW PRODUCTS AND DEVELOPMENTS

Want complete details on these announcements? Use the Reader Service Cards. You'll find them facing page 52 of this issue

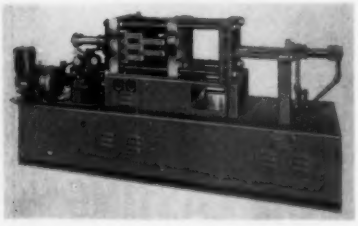
CONVEYOR FURNACES FOR CONTINUOUS PRODUCTION HEAT TREATING



Controlled atmospheres and temperatures and variable speed drives permit Hevi-Duty Electric Company's conveyor and pusher furnaces to meet a variety of production requirements. Heating elements are available which give clean, even heat and long element life at temperatures up to 2600°F. Cooling chambers with temperature control cool the work slowly or rapidly. High speed fans built into the furnace for forced heat circulation assure rapid and uniform heat distribution. Controlled atmospheres can be used in the furnace chambers and cooling zones, and chamber temperatures can be regulated by zone temperature control. Variable speed drives with convenient controls power mesh belts or link belts with trays or racks through the furnaces.

Circle No. 205 on Reader Service Card

NEW COLD CHAMBER DIE CASTING MACHINE



Model 150A, a low cost, high speed die casting machine for aluminum, magnesium and brass has been introduced by American Die Casting Machinery Co. The unit has a shot capacity of 2½ lbs. with automatic electric cycling rates up to 350 shots per hour. Die thickness is 6 inches minimum to 16 inches maximum.

Features and specifications include: solid block steel toggles; 150 ton locking pressure; 20 in. x 21 in. solid steel die platens; 10 in. shot cylinder stroke; plunger tip diameter 1½ in.-2 in.; moving platens supported by bronze carrier shoes; Nitralloy plunger and shot well.

The machine is also available in hot chamber type with hydraulically operated plunger, and the Model 150Z goose neck type for zinc, tin and lead.

Circle No. 206 on Reader Service Card

PLATING DEPTH GAGE PROVIDES CONTINUOUS MONITORING

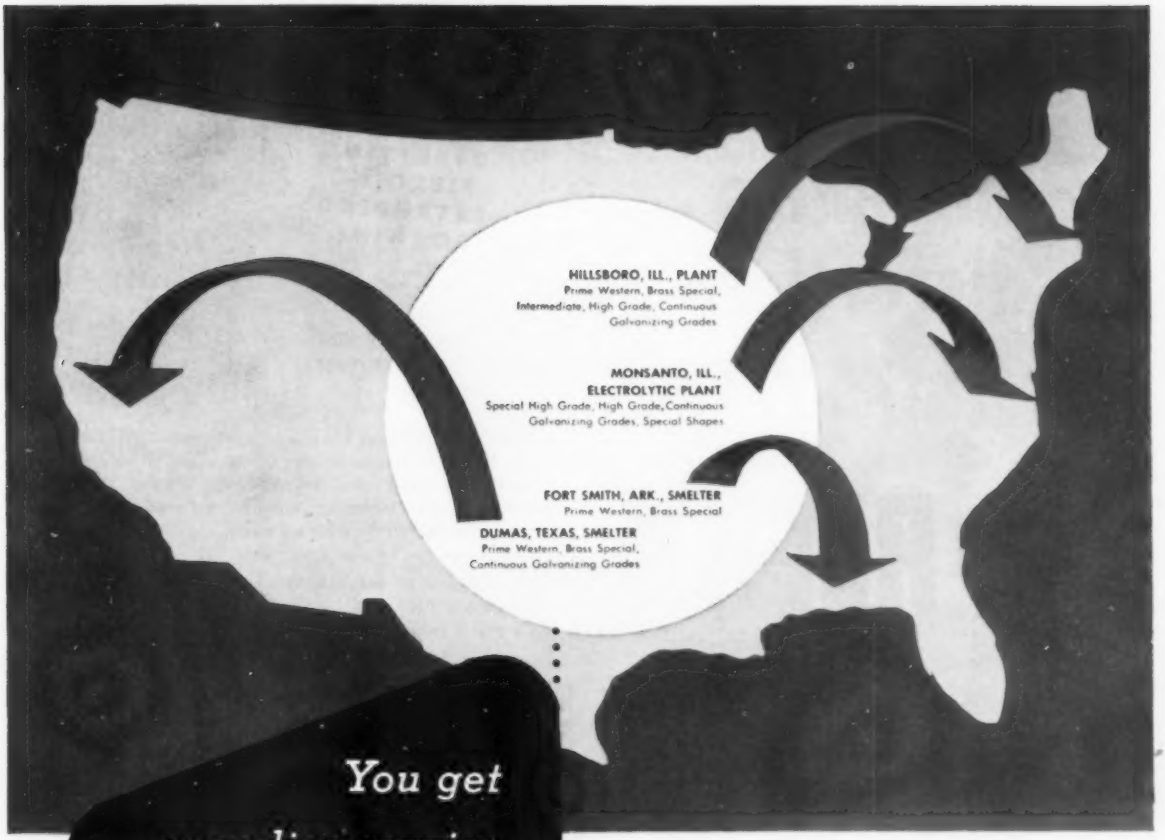
The Glennite Laminagage, Model FLW-1, measures the thickness of coatings and platings on base materials, and will detect surface and subsurface cracks in smooth and rough coatings, flat stock or plate and tubing. It can be used to measure coating thicknesses of odd shaped pieces and of parts moving on assembly lines.

Operating on the swept frequency eddy-current principle, the gage will measure coating thicknesses over the range of .00005" to .007" with an accuracy of 10%. Featuring high resolution and stability, the unit will measure ferrous and nonferrous materials and a wide range of conducting and nonconducting coatings on conducting base materials. Since conductivity and permeability differ, each application requires a different frequency, bandwidth, calibration and probe. Oscillator units, probes and calibration charts supplied with the instrument are readily interchangeable.

The Laminagage is produced by Gulton Industries, Inc., under patent rights held by the General Motors Corporation.

Circle No. 207 on Reader Service Card

continued on page 75


HILLSBORO, ILL., PLANT
Prime Western, Brass Special, Intermediate, High Grade, Continuous Galvanizing Grades
MONSANTO, ILL., ELECTROLYTIC PLANT
Special High Grade, High Grade, Continuous Galvanizing Grades, Special Shapes
FORT SMITH, ARK., SMELTER
Prime Western, Brass Special
DUMAS, TEXAS, SMELTER
Prime Western, Brass Special, Continuous Galvanizing Grades

You get speedier service from the ZINC ZONE

Central location of American Zinc plants assures prompt deliveries of slab zinc to any point in the nation.

PRODUCERS OF

ALL GRADES OF SLAB ZINC
ZINC ANODES (Plating & Galvanic)
METALLIC CADMIUM
SULPHURIC ACID
LEAD-FREE and LEADED ZINC OXIDES
ZINC CARBONATE
GERMANIUM DIOXIDE
AGRICULTURAL LIMESTONE
CRUSHED STONE

American Zinc sales Company

Distributors for AMERICAN ZINC, LEAD & SMELTING COMPANY

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For more information circle No. 9 on the Reader Service Card

TAPERED WALLS minimize distortion

acf

REFAX® POTS

TAPERING wall thickness and scientifically-designed side-wall angles minimize swelling and distortion, assure far longer useful life for acf Refax Pots. Alloy cast iron absorbs heat rapidly and holds it with minimum re-heating. Fast delivery in all styles and sizes. For complete information on the full line of Refax Pots, Ingot Molds, Utility Castings and Goosenecks, write Dept. PM-5.

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DIVISION OF acf INDUSTRIES, INCORPORATED
30 Church Street, New York 8, N. Y.

Sales Offices: New York • Chicago • St. Louis • Cleveland • Washington, D. C. • Philadelphia • San Francisco • Berwick, Pa. • Huntington, W. Va.
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For more information circle No. 2 on the Reader Service Card

For more information circle No. 25 on the Reader Service Card

BEST
FOR
UPSETTING
PIERCING
EXTRUDING
FORGING

PRODUCES MORE AND BETTER PIECES BETWEEN DIE CHANGES.

A graphited product for use in working hot metals of all kinds. Good in temperatures up to 2200° F and above. Keeps work cool and extends the life of dies and punches. Highly adhesive, may be applied by brush or swab or diluted with oil for spraying.

Bulletins describing Fiske's 514A Hot Die Lubricant and other specialty lubricants and coolants sent on request.

FISKE'S *Since 1870*

METAL WORKING LUBRICANTS

FISKE BROTHERS REFINING CO.
129D LOCKWOOD STREET, NEWARK 5, N. J.
Plants: Newark 5, N. J. and Toledo 5, Ohio

SELECT CENTURY FOR SPECIAL SHORT RUN DIE CASTINGS

DIE CENTURY CASTING CO.

MODERN EQUIPMENT TO MEET YOUR DIE CASTING NEEDS

SHORT RUNS
Small quantities made economically in both Zinc and Aluminum Alloys

UNIT DIES
For both Zinc and Aluminum Castings at a much lower die cost than conventional dies.
Unit Dies cover a wide range of casting sizes to fit your needs.

Consult Us on Your Requirements

CENTURY DIE CASTING CO.
2629 W. FLETCHER ST., CHICAGO 18, ILL.
TELEPHONE: IRving 8-2629

For more information circle No. 19 on the Reader Service Card

NEW PRODUCTS

continued from page 72

TRIMMING PRESS
. . . has speed adjustments

A new high-speed bench press built by Hannifin Company, a division of Parker-Hannifin Corp., has dual hand control and adjustable down stroke control as standard equipment. Electric push button controls with or without pressure reversal are optional. Return stroke is adjustable in all models, permitting the work cycle to be shortened to where the ram just clears the workpiece on repetitive operations. Tonnage is adjustable, from 10% of capacity to full, rated capacity.

Circle No. 208 on Reader Service Card

RETURN CYLINDERS
. . . are automatic

Four new lines of automatic-return and a new line of automatically reciprocating air cylinders have been introduced by A. K. Allen Co. The automatic-return cylinders are available for single control either by electric switch or bleeder valve and come with rods either normally retracted or extended.

The electric models VER are available for either 8, 110 or 220 volt operation. All models come in 1½", 2", 2½", 3" and 4" bore sizes. The automatically reciprocating ones require a single air connection to the cylinder-valve unit.

Circle No. 209 on Reader Service Card

continued on page 76

NOW A HIGHLY EFFICIENT METHOD FOR DEGASSING ALUMINUM ALLOYS

Completely New Foseco® DEGASER 400

- Inexpensive
- Easy to use
- Very little fuming
- Completely eliminates gas
- Produces high quality castings . . . economically

DEGASER 400 being plunged into aluminum alloy melt. Test results confirm that DEGASER 400 can produce aluminum alloy melts of such low hydrogen content that even in the heaviest cast sections pinhole porosity due to absorbed gases is eliminated.

See our exhibit at the A.F.S. Foundry Show, May 19-23. Booth No's. 2106-2206 Lower Lakeside Hall

FOUNDRY SERVICES, INC.

2000 BRUCK STREET COLUMBUS 7, OHIO

In Canada: FOUNDRY SERVICES (CANADA) LTD., 201-7 Alice St., Guelph, Ontario

Send this coupon for free leaflet and complete information about FOSECO DEGASER 400.

Name_____

Company_____

Address_____

City_____ State_____

For more information circle No. 27 on the Reader Service Card

12-INCH BOOSTER PUMP
. . . has 6000 cfm capacity

The B-12 booster unit with a 12″ inlet diameter produces pumping speeds between 5200 and 6000 cubic feet per minute at pressures from 0.8 to 5 microns of mercury.

Forepressure tolerance of 900 microns make the B-12 booster, manufactured by the NRC Equipment Corp., useful for installation in series with high vacuum diffusion pumps where maximum gas handling capacity is required in the submicron range.

The unit features a stainless steel body with external cooling coils. A 3-stage aluminum jet simplifies inspection and cleaning.

Circle No. 210 on Reader Service Card

HYDRAULIC VALVE
. . . for die-casting industry

A 3000 psi semi-automatic 4-way hydraulic valve has been announced by Sinclair-Collins Valve Co. The E-400-X series of 4-way valves provide leak-free operation with water, glycol or oil base fluids. The valve is activated by an integral double-acting cylinder controlled by a Speed King single or double solenoid pilot-operated valve. The valve will not reverse itself in case of air or electrical supply failure. The valves are made of corrosion-resistant materials throughout.

The 4-way hydraulic valves are available in 1″, 1½″ and 2″ NPT sizes, for line pressures up to 3000 psi. 60 to 125 psi air used for valve actuation.

Circle No. 211 on Reader Service Card

...NEWEST CONCEPT IN AIR AND GAS DRYING

UNIQUE DESIGN CONCEPT utilizes super-induced conduction to obtain continuous operation without the use of blowers, heat exchangers, or separate purge gases. This lowers initial cost without loss of operational efficiency and also minimizes maintenance requirements.

This NEW MOLECU-DRYER was designed in the Hayes Laboratory where constant research is quick to recognize the advantages of new developments and apply them to broaden or improve the wide line of "Certain Curtain" electric heat treating furnaces and allied equipment.

USING Linde MOLECULAR SIEVES

Registered Trade-Mark of Union Carbide

HIGH TEMPERATURE DRYING to dew points of minus 100°F or better possible through simplified, completely self-contained MOLECU-DRYER design built to utilize the superior adsorbent properties of *Linde* Molecular Sieves, recently developed by Linde Air Products Company, a Division of Union Carbide and Carbon Corporation.

REQUEST complete data on this new Hayes "Certain Curtain" MOLECU-DRYER. Act today . . . to discover what this totally new concept in air and gas drying can do for you!

C. I. HAYES, INC. MOLECU CERTAIN CURTAIN DRYER 819 WELLINGTON AVE. CRANSTON 10, R. I.

THE PIONEER in controlled-atmosphere (Certain Curtain) electric heat treating equipment.

For more information circle No. 32 on the Reader Service Card

NEW CEMENTED CARBIDE
. . . can be annealed, machined, hardened

Sintercast Corporation of America has developed a machinable carbide. Produced by powder metallurgy techniques and named Ferro-Tic, it has a composite structure which can be annealed and quench hardened by conventional heat treating procedures. In the annealed state, the material is readily machinable. Metal removing operations such as turning, milling, drilling and sawing are easily performed, so that carbide components requiring a complex geometric form or drastic changes in cross-section can be fabricated at lower cost than with tungsten carbide sections.

The hardening operation, following common tool steel practices, involves oil quenching from 1700°F. Once hardened, Ferro-Tic offers unusual wear resistance characteristics derived partially from its hard carbide phase and partially from a hardened matrix.

The manufacturer claims that in progressive blanking of .008 inch cadmium plated beryllium copper, a die and punch set of Ferro-Tic inserted sections produced 13 times as many parts between sharpening as the previously used tool steel sections.

Circle No. 212 on Reader Service Card

MICROSCOPE
. . . for quick precision measurement

The Toolmakers' Microscope is for the inspection and measurement of drills, taps, jigs, templates, broaches, etc. Manufactured by the Do-ALL Co., the instrument has a

total range of magnification of 27X to 360X. Standard lenses supplied give a magnification of 35X.

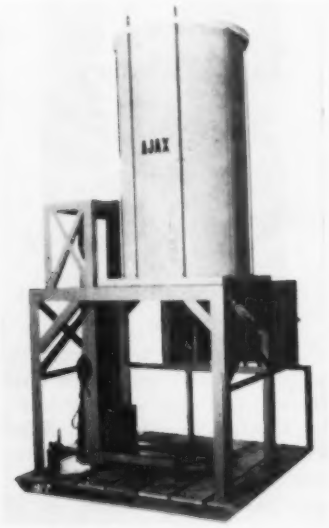
A working distance of 4" permits focusing on parts up to 2½" in depth. Vertical illumination eliminates the accuracy destroying shadows produced by oblique light.

Measurement is possible in two directions, controlled by micrometer spindles reading directly to .0001". Total stage movement is 1" x 2".

Circle No. 213 on Reader Service Card

CARBIDE SINTERING FURNACE . . . loads from bottom

This new high frequency induction furnace uses bottom load-



ing for maximum convenience and performance. A platform swings out for fast loading, then swings back beneath the furnace. A hydraulic lift carries the material up and into the furnace. The unit, introduced by Ajax Electrothermic Corp., can be operated at temperatures up to 2500° C and under special atmospheres if desired.

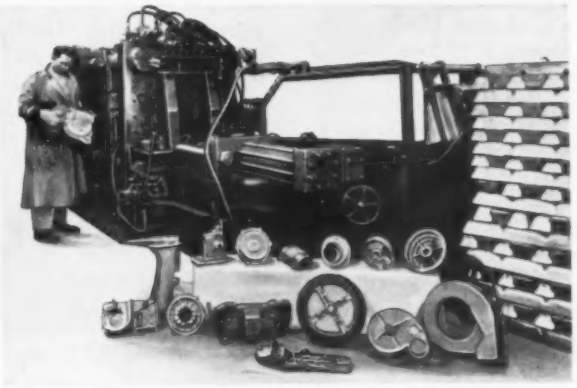
Circle No. 214 on Reader Service Card

ALUMINUM INGOT . . . has 99.99 per cent purity

Super purity aluminum in ingot form has been made commercially available by Kaiser Aluminum & Chemical Sales, Inc. Ingots of 6, 15, 30 and 50 pounds are being produced under carefully controlled conditions in refining cell facilities.

Circle No. 215 on Reader Service Card

For more information circle No. 26 on the Reader Service Card

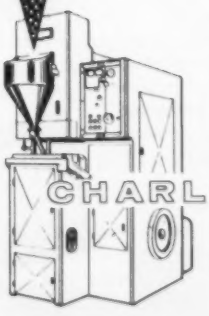


WHY ALUMINUM DIE CASTINGS?

The machines and facilities to produce sound, high density castings of various aluminum alloys are commonplace in our organization.

Federal
DIE CASTING COMPANY
2220 NO. ELSTON AVE., CHICAGO 14, ILL.
Phone

YOUR SINGLE SOURCE FOR ALL METAL POWDERS



in our 43rd year . . . . .

As producers and as sales agents for some of the largest domestic and foreign producers of metal powders, the Hardy Company has contributed to the expansion of the field of uses for metal powders and to the variety of powders available. This is your source for almost every metal or alloy that can be converted to powder, including the newest powders and cermets, as well as all the standard materials.

420 Lexington Ave., New York 17, N.Y.
Telephone: Lexington 2-4224

CHARLES HARDY, INC.

COMPLETE REFERENCE MANUAL ON METAL POWDER RAW MATERIALS NOW AVAILABLE. WRITE FOR YOUR COPY.

For more information circle No. 29 on the Reader Service Card

KARIAN TO HEAD IRON POWDER SALES

George G. Karian has been appointed Manager of Iron Powder Sales for the Alan Wood Steel Company, according to an announcement today by Perry L. Francis, Vice President in Charge of Marketing. Mr. Karian was formerly Product Manager in charge of sales of powder metal and industrial compacting presses for the F. J. Stokes Corporation of Philadelphia.

In his new position, Mr. Karian will supervise all product sales and customer service activities for iron powder. Alan Wood has become active in the iron powder field as the result of a six-year program that has resulted in the development of a new low-cost iron powder plant in the vicinity of its steel making plants here.

WAGNER BROS. NEW COWLES DISTRIBUTOR

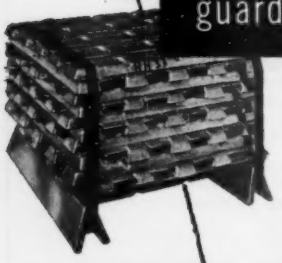
Wagner Brothers Inc., Detroit, has been appointed a distributor for the complete line of metal finishing chemicals produced by Cowles Chemical Company here.

According to C. C. Clabaugh, manager of Cowles metal finishing chemicals department, Wagner will carry stocks of the products at its various regional warehouse points. Cowles sales and technical service personnel, Clabaugh says, also will work closely with Wagner's local representatives.

The metal finishing chemicals, he states, will continue to be sold by present Cowles distributors, as well as direct from the company's warehouse stock points.

you have a quality-control watcher in **our** plant!

the **HENNING** spectrograph guards the purity of your alloys



Henning's modern metallurgical control methods for quality ingot production include spectrographic analysis of every heat. No other method will give such accurate and precise results.
Just as important is the ability of H.B. & S. metallurgists to produce large uniform heats. And every heat is given an identifying number, which is your assurance of thorough inspection at every stage of production.

Write today for a copy of H B & S' Helpful Alloy Wall Chart

Henning alloy bars are shipped to you on consumable skids of the same alloy at no extra charge, and each bar is stamped to identify the alloy.

HENNING BROS. & SMITH, INC.

Brass, Bronze, Aluminum Ingot Alloys. Zinc-base & Zamak Die-Casting Alloys

"Dependable Service Since 1922"
91-117 Scott Avenue, Brooklyn 37, N. Y.

For more information circle No. 30 on the Reader Service Card

WEST AND COPE IN NEW POSITIONS AT THE ELECTRIC FURNACE CO.

C. L. WEST

C. L. West, veteran employee and officer, has been named chairman of the Board of Directors at The Electric Furnace Co., Salem, Ohio it was announced today. West, who has been vice president, will remain active in the management of the company.

F. Troy Cope Jr., also a longtime employee, will become vice president in charge of sales. His father, the late F. Troy Cope Sr. was chairman of the board at his death in 1952 and the post has remained vacant since that time.

NORWALK POWDERED METALS ORGANIZED

Announcement has recently been made of the formation of Norwalk Powdered Metals, Inc., formerly General Powdered Metal Products, Inc., the new company has no affiliation with the Holly Corp. the former parent company.

Officers of the new corporation are: Andre Blumenthal, pres.; Ralph Macy, vice pres. and treasurer; John Caputo, vice pres., and Leslie Davis, secretary.

PLAST-IRON POWDERS

NEW

Grade A-213

Electrolytic 100 Mesh

Non-Laminating Electrolytic Iron Powder

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PM 74

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NEW PLANT MANAGER FOR MOHAWK FOUNDRIES

Sam Lashutka

S. Lashutka, veteran foundryman, has been appointed plant manager of Mohawk Foundries, Inc. In this capacity, Mr. Lashutka will have complete charge of the die casting operations at Mohawk.

Prior to going with Mohawk, Lashutka has had over 25 years experience in various phases of non-ferrous foundry work including sand, permanent mold and die casting of aluminum, magnesium and zinc. A graduate industrial engineer, Mr. Lashutka has been in charge of both managerial and technical phases of casting design and production.

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DIE CASTINGS for 55 YEARS

have combined the experience of the *past* with the vision of the *future*. We are one of the oldest die casting companies in the Mid-West.

ZINC or ALUMINUM

We can give you precisely *what* you want *when* you want it.

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NEW

Grade B-280

Reduced • 80 Mesh

Improved Sponge Iron Powder

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Complete Interchangeability For Present Dies

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Competitively Designed

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One Fine Zinc For Die Casting

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Die Casting specialists since 1922

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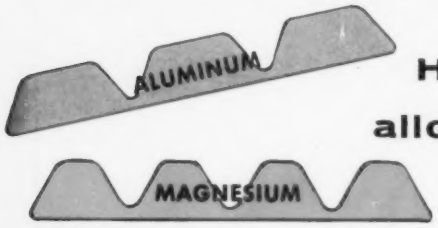
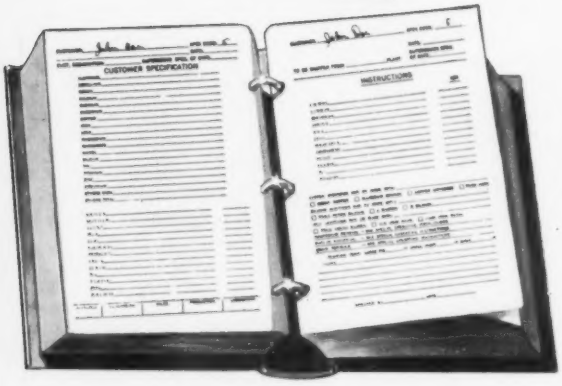


How APEX Production Control produces alloys tailored to your specifications with certified accuracy



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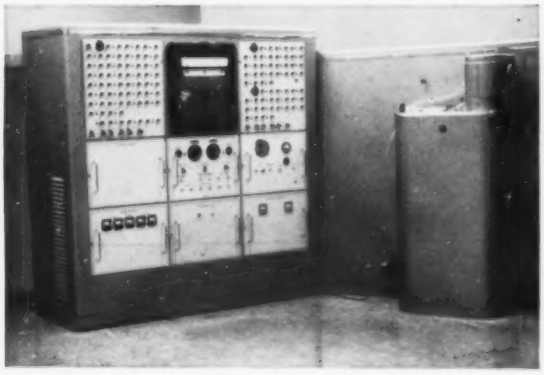
Once recorded, your particular specs become the formula for your alloy production in all Apex plants. Under meticulous control, you receive an alloy to meet casting applications requiring special mechanical properties, physical properties, machinability, corrosion resistance or other individual needs. The Spec Book also includes specifications for all standard alloys conforming to governmental and society specifications.



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